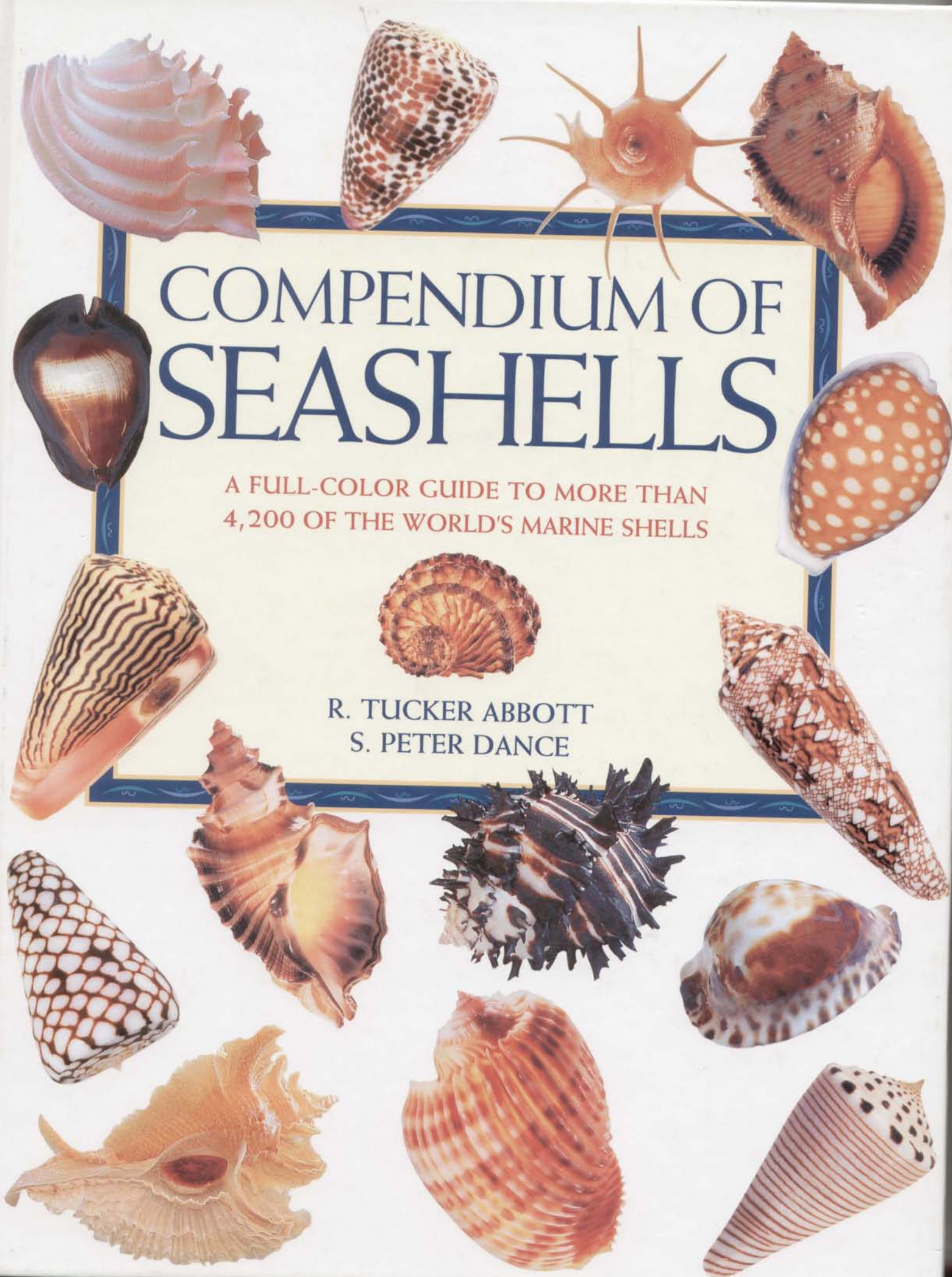


A FULL-COLOR GUIDE TO MORE THAN
4,200 OF THE WORLD'S MARINE SHELLS

R. TUCKER ABBOTT
S. PETER DANCE



COMPENDIUM OF SEASHELLS



R. Tucker Abbott (left) and S. Peter Dance.

Books by R. Tucker Abbott

- Compendium of Landshells*
(American Malacologists, Inc., 1989)
- Standard Catalog of Shells* (with R.J.L. Wagner)
(American Malacologists, Inc., 1978)
- Caribbean Seashells* (with G.L. Warmke)
(Dover Pub., 1976)
- Kingdom of the Seashell*
(Crown Publ. Co., 1972)
- The Shell* (with Hugh and Margarite Stix)
(Harry Abrams, Co., 1968)
- Seashells of North America*
(Golden Press, 1968)
- Seashells of the World*
(Golden Guide, 1962)
- How to Know the American Marine Shells*
(New World Library, 1961)
- American Seashells*
(Van Nostrand Reinhold, 1954 and 1976)

Books by S. Peter Dance

- Seashells. Bivalves of the British and Northern European Seas* (with J. Moller Christensen)
(Penguin Books, 1980)
- Art of Natural History*
(Overlook Press, 1978)
- The Shell Collector's Guide*
(David & Charles, Newton Abbott, 1976)
- The Collector's Encyclopedia of Shells*
(McGraw-Hill, 1974)
- Shells and Shell Collecting*
(Hamlyn, 1972)
- Seashells*
(Hamlyn, 1971)
- Rare Shells*
(Faber & Faber, 1969)
- Shell Collecting: An Illustrated History*
(Faber & Faber, 1966)

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4,200 OF THE WORLD'S MARINE SHELLS



R. TUCKER ABBOTT
S. PETER DANCE



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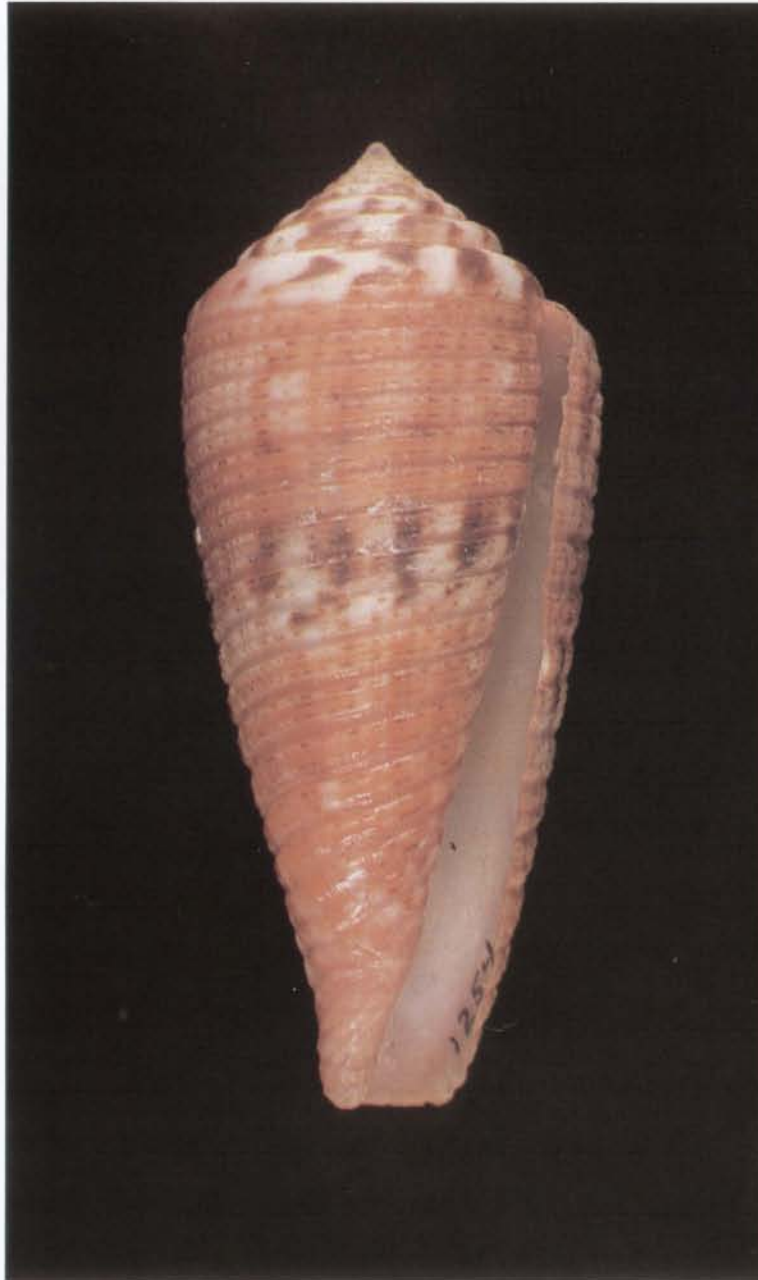
This book is
dedicated to our wives—
Cecelia Abbott and Una Dance



Annandale's Murex *Naquetia annandalei* (Preston, 1910), from Southeast Asia.

CONTENTS

PREFACE	ix
INTRODUCTION	1
ACKNOWLEDGMENTS	17
UNIVALVES (Limpets, Conchs, Whelks and Other Snails)	18
DENTALIUMS AND OTHER TUSK SHELLS	282
CHITONS OR COAT-OF-MAIL SHELLS	284
BIVALVES (Mussels, Scallops and Clams)	289
NAUTILUS AND SQUIDS	376
STRANGE FORMS OF SHELLS AND NON-MOLLUSKS	378
TAXONOMIC CLASSIFICATION OF MOLLUSCA WITH MAJOR BIBLIOGRAPHIC REFERENCES	379
INDEX TO POPULAR NAMES	391
INDEX TO SCIENTIFIC NAMES	393



A Gastropod: Glory-of-the-Atlantic Cone (*Conus granulatus* Linnaeus, 1758), from the Caribbean Sea.

PREFACE

Shell collecting as a hobby has had a remarkable resurgence in the last few years. To a considerable extent this has been brought about by an increasing interest in ocean life and a deep concern for anything to do with our fragile natural environment. More particularly, however, it is due to the availability of a host of remarkable, long-lost or newly discovered species of mollusks now being obtained by various methods, such as netting and diving, from exotic parts of the globe.

Although science has not kept pace with these recent discoveries, amateur collectors are well aware that a new Golden Age of conchology has dawned. This situation underlines the need for good shell identification guides. Some excellent regional shell books compiled by professional conchologists are available for some areas, such as New Zealand, Hawaii, and North America, but no book has given a useful and reliable overview of most of the world's better known marine shells.

About 30,000 species of marine mollusks are known. Thousands are less than half an inch in size, even in the adult stage; many hundreds are confined to the great depths of the oceans. Our book concentrates on all the others. Their inclusion here is based on several factors: attractiveness, desirability, rarity, and availability. Included are most species belonging to popular groups, such as the cones, volutes, cowries, murexes, scallops, and thorny oysters. At the same time we have not overlooked periwinkles, oysters, limpets, and other less attractive groups. We have attempted to strike a balance between the popular and the less popular.

Intended primarily for the amateur shell collector, our book also serves the scientific community. It contains photographs of several hundreds of type specimens from museums and private collections, those unique specimens to which scientists *must* refer when the exact identity of a species must be established. As such specimens are seldom allowed to leave the institutions in which they are housed, the publication of their portraits herein may save someone considerable time and traveling expense.

The photographs and the brief accompanying texts provide a quick guide to those marine species the amateur conchologist is most likely to encounter while doing fieldwork, exchanging, or purchasing from commercial sources. The combined classification and bibliography, arranged by families and by geographical regions, will guide him to more sophisticated monographs and textbooks.

R. TUCKER ABBOTT
S. PETER DANCE

INTRODUCTION

SEASHELLS

Hard external coverings are typical of several very different kinds of marine animals, including barnacles, crabs, sea urchins, and mollusks. The coverings of all these animals may be described as shelly, but only those associated with mollusks are correctly known as seashells. Essentially, a seashell is the solid and usually inflexible outer covering of a soft-bodied, fleshy animal. It is to a mollusk what the skeleton is to a mammal: a means of support and protection for the otherwise unsupported and vulnerable soft body parts. Some mollusks, such as land slugs and sea slugs, do not have a shell, but it is the most characteristic feature of the great majority of them.

Shell-bearing or not, all mollusks belong to one of the major groups of the animal kingdom: the Mollusca. Second in size only to the Arthropoda (which includes insects, crustaceans, etc.), the phylum Mollusca includes cockles, mussels, oysters, conchs, land snails, sea slugs, nautilus, and many more. There may be as many as 60,000 living species, many of them found in land or freshwater habitats, but most of them living in the world's seas.

Kinds of Shells

In order to understand and organize such a large number of species, it has been necessary to follow the age-old system of classifying the phylum into various categories, or groups. Our book is arranged in the standard systematic order. The more primitive, or more simply constructed, families are dealt with first, and the more advanced or more highly evolved ones follow in a regular, widely accepted sequence. It is worth remembering that without good classification, good biological or economic work in zoology is scarcely possible. The taxonomy, or classification, of a group, however, depends on the concept of a species. After all, shells are not like stamps and coins; they are living organisms subject to the laws of nature.

Species

Ever since Charles Darwin challenged the notion that a species is something specially created and not subject to change or evolution, specialists have been arguing about the nature and definition of a species. The argument is far from being resolved. At present it is widely accepted that there is more than one kind of "species," each kind requiring its own definition. The only one that need concern us here is the biological species, or "biospecies." A biospecies consists of individuals that look alike and are potentially capable of interbreeding to produce further examples of their own kind. Should a



Snowflake Marginella (*Marginella guttata* Dillwyn, 1817), from Florida and the West Indies. (Photo: Pat Armes)

population become geographically isolated from the main stock of individuals comprising the biospecies it may, in time, evolve its own distinct morphological features. Eventually members of that isolated population may differ so markedly from the parent stock that they are no longer capable of interbreeding with it. At this point the isolated population has become a different species. Before that stage is reached, however, the observable differences in the external appearance of its members, if sufficiently striking, may warrant its being accorded subspecific rank and its own scientific name. A number of subspecies, indicated by a three-part scientific name, are to be found in this book.

As in garden flowers, domestic breeds of animals, and even in human beings, there are numerous color and shape variations. Some are caused by simple genetic differences (red, white, or yellow flowers); others are caused by lack of adequate food, overcrowding, or adverse environmental conditions. These differences are not permanent, but are sometimes so distinctive that it is practical to give forms displaying them a scientific name. Form names (e.g., *rubra* for a red shell; *imbricata* for a scaly shell) are used in conchology as "handles" for odd specimens that do not represent different species or subspecies.

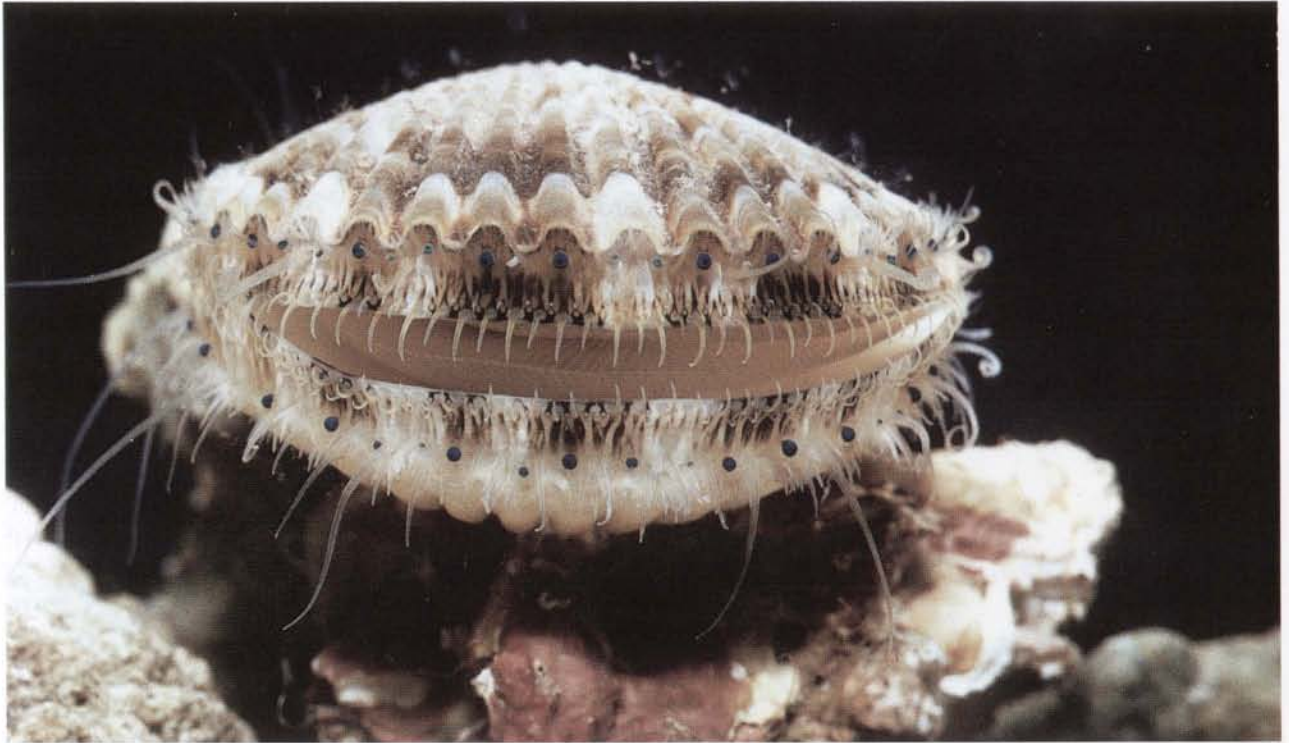
CLASSIFICATION

To comprehend such a varied assemblage of life forms, the phylum Mollusca is divided and subdivided into manageable groups. Most authorities now place living mollusks in seven classes: Aplacophora, Polyplacophora (the chitons), Monoplacophora, Gastropoda (the univalve snails), Bivalvia (the clams), Scaphopoda (the tusk shells), and Cephalopoda (the squids). Of these the Gastropoda and the Bivalvia account for the great majority of living mollusks. Some of the salient features of each class are outlined below.

Gastropoda (snails, whelks, slugs, limpets, cowries, etc.): mollusks usually with tentacles and eyes, a broad foot, and a visceral hump, the latter being commonly contained within a shell that may be coiled. Within the mouth of these univalves there may be many or few teeth, arranged in rows on a ribbonlike structure (the *radula*). A characteristic feature of many gastropods is the *operculum*, a horny or calcareous structure attached to the foot. The operculum seals, or partially seals, the aperture when the animal withdraws into its shell, or is used to help the animal obtain a purchase during locomotion. It is estimated that there are about 20,000 living species of marine gastropods.

Bivalvia (cockles, mussels, oysters, razor shells, etc.): laterally compressed mollusks contained within a two-piece (or *bivalved*) shell, the valves being hinged, and joined, as a rule, by an elastic ligament. One or two adductor muscles open and close the valves. Most bivalves have a large foot, a pair of siphons, and a fleshy, shell-forming mantle lining each valve. There may be 10,000 living species of bivalves in the world's seas.

Scaphopoda (tusk shells, or tooth shells): bilaterally symmetrical mollusks with a tusklike shell, open at each end, the anterior end being the larger. The posterior end commonly protrudes above the sand in which tusk shells live. There is a large foot and a radula, but head, eyes, and gills are lacking. About 350 living species, all marine, are known.



A Bivalvia: Living Bay Scallop (*Argopecten concentricus* Say, 1822), from the Eastern United States. (Photo: D. M. Opreska)

Aplacophora (solenogasters): wormlike, mostly very small mollusks covered with calcareous spicules. Exclusively marine, they feed on bottom-dwelling animals, such as coelenterates, or on organic debris, and have been recorded from great depths. About 250 species have been described.

Polyplacophora (chitons, or coat-of-mail shells): elongate-oval mollusks with a broad or narrow foot and a flattened visceral hump over which is situated an articulated, eight-piece shell, the outside edges of which are embedded in and surrounded by a flexible "girdle." About 650 species are known, mostly found clinging to in-shore rocks, though a few deep-water species have been recorded.

Monoplacophora (segmented limpets, or gastroverms): limpetlike mollusks with internal segmentation and a thin, almost circular, caplike shell. About 10 species of these "living fossils" are known, all from deep water. Of abiding interest to zoologists, the shells of these primitive creatures are not featured in this book because they are so small and rare.

Cephalopoda (nautilus, cuttlefish, octopuses, squids): equipped with large eyes, a powerful beak, and sucker-studded tentacles, a cephalopod seems to have little in common with other mollusks, although the possession of a radula and, occasionally, a shell indicates that it may be more closely related to them than outward appearances and habits suggest. There may be as many as 1,000 different species of cephalopods living in the world's seas.

Each of these classes is further subdivided into progressively smaller categories, the ultimate category being the species (or subspecies). To show the relationship of these



A Cephalopod: A cut section of the Chambered Nautilus (*Nautilus pompilius* Linnaeus, 1758), from the Philippines.

categories, the classification of the Great Scallop is set out below. The authorities for the names and the dates those names were first proposed in print have been added.

In the *Systema* Linnaeus described a majority of the animal species then known to Europeans and gave each animal a two-part name. It was then that the Great Scallop received the scientific name *Ostrea maximus*. The first part of the name, *Ostrea*, is the genus (or generic) name. The second part, *maximus*, is the specific (or trivial name), rooted in Latin and intended to be universally understood and accepted (for reasons that made more sense in 1758 than they do now).

All the species Linnaeus placed in his genus *Ostrea* he considered to be closely related. As his knowledge of mollusks was superficial and was based almost entirely on shell characters (often only on crude pictures of shells in old books), later workers have been compelled to make many alterations and additions to his treatment of the Mollusca. It was obvious to the Danish naturalist O. F. Müller, for instance, that the Linnaean genus *Ostrea* contained species totally unrelated to each other. He removed *Ostrea maximus* and some other scallop species from the genus *Ostrea* (which genus is now used exclusively for oysters) and placed them in a new genus of his own invention,

Pecten. Switching species from one genus to another goes on all of the time because our knowledge of mollusks, indeed of all animals, is changing constantly. When a change from the original genus occurs, the author's name and date are put into parentheses: for example, *Pecten maximus* (L., 1758).

The classification of the Great Scallop (*Pecten maximus*)

Phylum	Mollusca	Cuvier, 1797
Class	Bivalvia	Linnaeus, 1758
Subclass	Pteriomorpha	Beurlen, 1944
Order	Pterioida	Newell, 1965
Suborder	Pteriina	Newell, 1965
Superfamily	Pectinacea	Rafinesque, 1815
Family	Pectinidae	Rafinesque, 1815
Subfamily	Pectininae	Rafinesque, 1815
Genus	<i>Pecten</i>	Müller, 1776
Subgenus	<i>Pecten</i>	Müller, 1776
Species	<i>maximus</i>	Linnaeus, 1758

The genus name is always capitalized (for example, *Pecten*), while the species, or trivial name, and any subspecies name, is not (for example, *maximus*). The name of the describer, or author, follows (for example, Linnaeus—abbreviated in this book in the interest of space to L.). Then follows the year in which the species was described. Thus, "L., 1758" or "Reeve, 1847," gives us a bibliographic indication to the describer and the date of the description. It is customary to print the name of the genus and species in italics (for example, *Pecten maximus*), but not the higher categories.

Zoological Taxonomy

From the discussion on classification it is evident that the naming of animals is a science in itself. Ever since the birth of language animals have been given common (or vernacular) names, but it was not until the eighteenth century that a logical system of zoological nomenclature was proposed. The official starting point for the scientific naming of animals is 1758, the year in which the Swedish naturalist Carl Linnaeus published the tenth edition of his *Systema Naturae*.

Because several scientific (Latinized) names may have been applied to the same species by different research workers, the international rules require that the earliest name be used. The later names are known as *synonyms* and should not be used. Rarely, an earlier name is discovered in an obscure and overlooked publication. If that overlooked name has not been used for the last fifty years, the International Commission can officially reject the earlier name, thus saving a well-known name from being discarded.

Sometimes the same name is proposed for two different species. For example, in 1819 Lamarck might have described a *Conus albus* as a European fossil. Later, in 1910, and not knowing about Lamarck's use of the name, Mr. Smith may have described a

Conus albus, a totally different species from, say, Australia. Smith's *C. albus* is a homonym, and if it is a valid species, must be given a new name.

The term of *authors* sometimes appears in the synonymy (e.g., *Conus magus* of authors). This means the shell has been called *magus* in the past by various authors, but that this is not the true *magus* Linnaeus, 1758.

The code of rules drawn up for the guidance of zoological taxonomists is available, in a book titled *International Code of Zoological Nomenclature* (1964), from the International Trust for Zoological Nomenclature, c/o British Museum (Natural History), Cromwell Road, London, SW7. A full treatment of zoological taxonomy is the subject of R. E. Blackwelder's *Taxonomy* (1967), John Wiley & Sons, Inc., New York, N.Y.

Type Specimens

One of the novel features of this book is the large number of type specimens used to illustrate species. As the expression *type specimen* will be meaningless to some readers, a few words of explanation are called for.

When a supposedly new species is described it is reasonable to assume that specimens of it exist, or have existed, somewhere. It cannot always be assumed that the original describer has seen or handled specimens himself; he may have described the species on the basis of earlier published figures of specimens representing it. Specimens upon which the original description and/or illustrations are known to be based are called *type specimens*, or simply *types*.

There are several different categories of type specimens, the most important being the following:

Holotype: the single specimen, designated in the original description as the primary or "name-bearing" specimen. If the new species was based on a single specimen, it is automatically the holotype.

Paratype: any specimen from the original type series other than the holotype.

Syntype: one of a series of two or more specimens upon which the original description was based and in which a holotype was not selected.

Lectotype: a specimen from the syntype series, designated subsequent to the original description as the primary or "name-bearing" specimen; it is equivalent in status to the holotype.

HABITATS OF MOLLUSKS

Mollusks are adapted to live almost anywhere except in barren, lifeless zones where food is non-existent or inaccessible. Thus, sandy areas are havens for mollusks with long siphons and bodies adapted for burrowing, such as a majority of bivalves, many gastropods, and most tusk shells.

A mixture of sand and mud will provide an even better habitat for burrowers because it is more food-laden. Here is the ideal environment for *Nassarius* and many miters, numerous bivalve groups, and particularly those with delicately constructed shells. Mangrove swamps provide an even richer environment, consisting mostly of sticky mud.

Mollusks with stronger shells are often able to withstand the very rough conditions associated with open rocky shores. On the exposed surfaces of rocks and cliffs may be

found limpets, top-shells, and chitons in abundance. Many less sturdy mollusks find homes in crevices or under rocks. Some bivalves, such as the piddocks (*Pholas*), bore holes in solid rock, imprisoning themselves for life, secure against any predator, except, of course, a shell collector with rock-breaking equipment.

Where coral flourishes mollusks may flourish too. Soft corals and seafans provide homes for a wide assortment of species including many of the most colorful. As many species again may be found among dead coral rubble, under coral blocks, and in coral sand.

Many mollusks, including larval forms of sedentary shells, spend part of their lives drifting about in the upper levels of the sea. Some are pelagic all their lives. Here, for instance, is the entire world of those butterflies of the ocean, the pteropods. Here, too, the purple snails (*Janthina*), drift about attached to their egg rafts. If they do not drift onto a beach, they will spend their entire lives out at sea.

At the other extreme many mollusks eke out a precarious existence on the ocean floor at great depths. The quiet, cold, lightless environment usually ensures that mollusks will produce thin, white shells. Recent explorations near the Galapagos Islands, however, have revealed populations of large, robust bivalves thriving about one and a half miles below the surface. Warm, bacteria-laden water gushing up from fissures in the ocean floor has created unusually favorable conditions for marine life in what would have been an otherwise sterile environment. Evidently mollusks are capable of exploiting almost any ecological niche as long as there is an adequate food supply and not too high a level of predation.

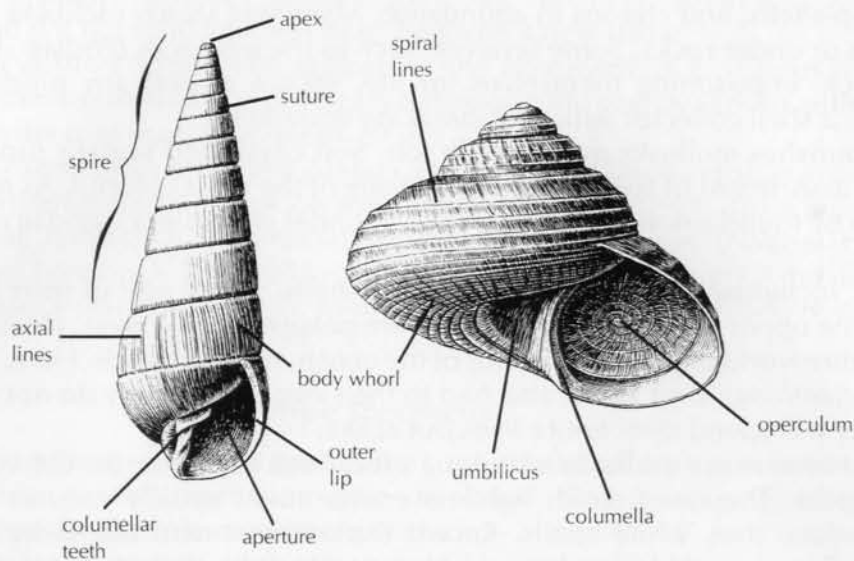
SHELL FEATURES AND IDENTIFICATION

A shell is composed of one, two or eight pieces. It may be thick or thin, opaque or translucent, colorful or colorless, smooth or variously ornamented with spines, scales, ridges, furrows, pits, and other relief or incised features. Its overall shape is what makes it so obviously a shell and gives us our first clue to its identity.

For many of us a typical shell is formed of one piece and is coiled. Essentially that describes most gastropod shells, their normal form being an elongated cone spirally twisted around an imaginary axis, the spiral usually following a clockwise course from apex to aperture. The illustrations in this book show that every conceivable variation on the spiral has been exploited by gastropods. Fundamentally, however, a gastropod shell is an expanding tube having an anterior and a posterior end (the direction of the contained animal's forward locomotion dictates which end is the anterior—almost invariably the apertural end).

The successive turns of the shell are called *whorls*, the largest being the last formed. The largest whorl contains the bulk of the animal and is called the *body whorl*. The *aperture* is the hole or space at the anterior end of the body whorl, the edge of the aperture being called the *lip* (or peristome). When the lip is thickened it usually indicates that the shell has reached maturity. In some families, such as Muricidae and Cassidae, the lip is thickened at fairly regular intervals, the successive thickenings being known as *varices* (singular *varix*).

The *outer lip* is that part of the lip farthest away from the shell's imaginary axis. On the opposite side is the *inner lip* (or, in place of it, the *parietal wall*). Winding around the imaginary axis is the *columella*, which may be encircled by folds or plicae. The colu-



Drawing of parts of gastropod

mella may be greatly extended forward to form a *siphonal canal*, as can be easily seen in the genus *Murex*. The hole bounded by the columella is known as the *umbilicus*. It varies in width and apparent depth from species to species and genus to genus, but many gastropods do not have one at all. It is still a constant enough feature within a single species, however, to be important in identification.

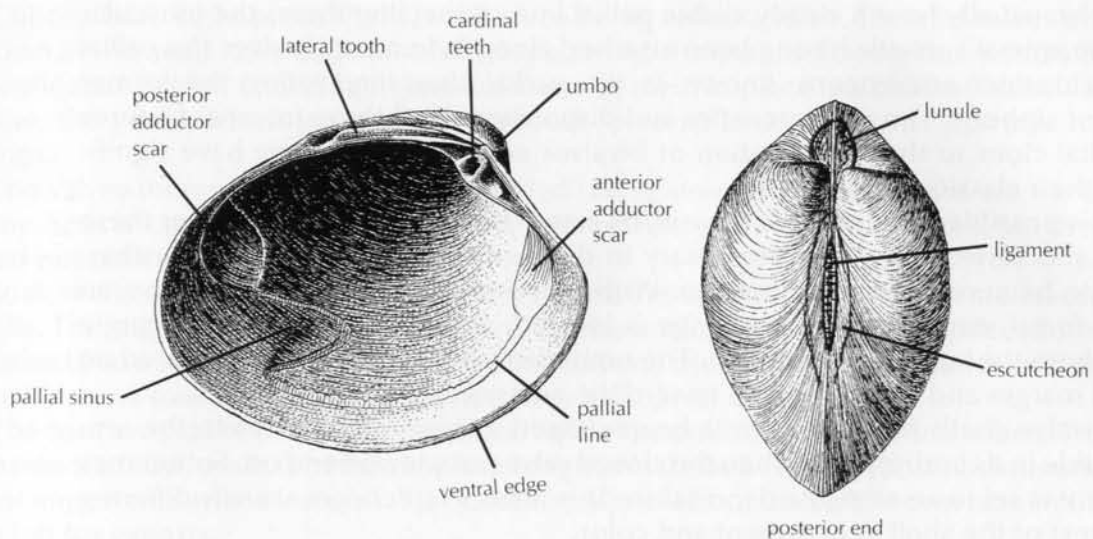
In some genera, such as *Bursa*, there is a small *posterior canal* at the upper end of the aperture. In the slit shells (*Pleurotomaria*) there is a broad band encircling the whorls and confluent with the prominent slit in the outer lip characteristic of members of this genus. The band, resulting from shelly matter being deposited on the site of the slit as the mollusk grows, has been christened the *selenizone*, an allusion to the crescent-moon shape of the successive depositions.

Shells belonging to the family Turridae have a slit or groove in the upper half of the outer lip that is filled in as the shell enlarges. Its track, clearly visible on earlier whorls, is known as the *anal fasciole*. The lower part of the outer lip in *Strombus* shells has a shallow embayment resembling the depression left when a potter's finger is pressed into the lip of a moist clay pot. This is the *stromboid notch*.

The meeting place of the whorls is the *suture*, which may be scarcely perceptible or marked by a fine line, a thickened crest, or a deep channel. Like the groove in a phonograph record the suture is continuous. A gastropod shell has only a single suture.

Among mollusks whose shells are not coiled the family Fissurellidae is noteworthy for the apical hole found in most of its members. A vertical slit at the edge of the shell is the hallmark of most species of *Emarginula*, while the expansive shell perforated with a row of holes is characteristic of the Haliotidae.

These shell features correspond to features in the mollusks' soft anatomy or have a function related to certain needs of the animals. The siphonal canal of a *Murex*, for instance, is for the reception of a siphon. The stromboid notch, strange though it may



Drawing of parts of bivalve

seem, is to make it possible for the animal's right eyestalk to protrude (that part of the shell being adjacent to the right eyestalk when the animal is active).

Various superficial, but often very conspicuous, features ornament the surface of a gastropod shell. Always it has *axial* growth lines (these being parallel to the apertural lip). Sometimes it will have thick or thin axial *ribs*, small or large *nodes* or *nodules*, *scales* or *spines*, their arrangement being axial or *spiral* (in line with the direction of growth). Occasionally axial and spiral features combine to form a *reticulate* ornament. A *cancellate* or *decussate* ornament is similar, but the spiral and axial features cross at right angles to form a pattern of tiny squares.

The shell may also be ornamented with incised features, known variously as *lines*, *striae* or *furrows*, depending on their depth and width. Close examination may reveal that these incised features are actually rows of minute pits. Shells so ornamented are said to be *punctate*.

Because successive whorls largely overlap one another, the gastropod animal eventually resorbs or obliterates some of the ornamental features it has laid down previously. The bivalve animal, following a different growth pattern, rarely interferes with any part of its shell once it has been formed.

With few exceptions bivalves have two-piece shells, each piece being called a *valve*. The two valves, equal or unequal in shape and size, are joined together by a flexible, chitinous *ligament* and they close effectively because the upper, inner edge of each has a *hinge* embellished with interlocking teeth and pits. The small teeth immediately below the *umbones* (embryonic valves) are the *cardinals*, the longer ones on each side of them, the *laterals*.

Also visible on the inside of each valve are marks left by certain muscles. The adductor muscles (those that are used to pull the two valves together) leave prominent *adductor scars* in the valves. In some bivalves, such as oysters and scallops, there is only one adductor scar in each valve, but many more have two in each valve. Those with two

in each valve usually have a clearly visible pallial line connecting them, the muscular edge of the animal's mantle having been attached along it. In most bivalves the pallial line has a distinct embayment, known as the *pallial sinus*, indicating the former presence of siphons. The characteristics and disposition of all these internal features provide vital clues to the identification of bivalves and sometimes they have significance for their classification as well.

Often it is possible to identify a bivalve by its external characteristics alone, for these are many and varied. It is often necessary to distinguish one valve from the other, however, to be sure of an identification. With very few exceptions bivalves have an upper or *dorsal* margin (where the hinge is located) and a lower or *ventral* margin (usually where the valves open widest). The umbones (singular *umbo*) are situated on the dorsal margin and usually incline toward the anterior end of the shell.

Many bivalve shells have a *lunule* (a heart-shaped impression anterior to the umbones) visible in its entirety only when the closed valves are viewed end on. Sometimes the ligament is set in an elongate depression. This is the *escutcheon*, usually differing from the rest of the shell in ornament and color.

Peculiar to some bivalves are the so-called *ears*, lateral extensions on each side of the umbo, or on one side only, of each valve. A prominent feature of scallop shells is the anterior ear, which may be markedly longer than the posterior one. The anterior ear of the right valve may also be indented by a *byssal notch*. It is through this feature that a kind of all-purpose anchor made of fine threads protrudes. Known as a *byssus*, it enables the bivalve to secure itself to other objects. Sometimes the byssus takes the form of a *byssal plug* and this is fixed to other objects through a byssal hole, easily visible in jingle shells (*Anomia*) and always perforating the right (lower) valve.

Clearly, the correct identification of a species may depend on characteristics present in one valve, either the right or the left. It is necessary, therefore, to be able to distinguish one from the other. There are two simple ways of orienting the valves of most bivalves correctly. If the closed valves are placed so that the umbones are uppermost and the external ligament is between them and you, then the valve on your right is a right valve. The inside of the valves may also provide a clue. With the umbones uppermost, locate the pallial sinus, assuming one is present. If the indentation opens to the right, then it is a right valve.

As with gastropod shells, bivalve ornament may be raised above the shell surface or engraved into it. Both kinds of ornament are laid down either concentrically or radially. *Concentric* ornament always lies parallel to the margins of the valves and is frequently identical with a growth stage. It varies from exceedingly fine to conspicuous and may take the form of raised lines, threads, ribs and *folds*, or incised striae, grooves and punctations. *Radial* ornament (which tends to be similar to but stronger than concentric ornament) radiates outward toward the margins from the umbones.

Radial and concentric ornament are frequently present on the same shell, but one is usually stronger than the other and overrides it. If of equal strength the concentric ornament often takes the form of *beads*, *pustules*, *tubercles*, or *scales*. In a few species the ornament on the right valve differs from that on the left, as may be seen clearly in various scallops.

The shells of gastropods and bivalves may have a horny covering over the outer surface. Known correctly as the *periostracum* (and incorrectly as the epidermis), it may be thin and translucent, thick and fibrous, or may even appear to be hairy. It is seldom colorful, but in the gastropod genus *Latirus* it is iridescent. Occasionally the periostracum is helpful in identification but more often it is a hindrance.

Chitons have eight-piece shells, each piece being called a valve. The end valves are known as the *head valve* and *tail valve*, respectively, the other six being the *median* or *intermediate valves*. Encircling them and keeping them in place is a band of muscular tissue, the *girdle*, which is smooth or variously ornamented with *scales*, *spicules*, or *spines*.

The valves themselves may be ornamented but seldom in high relief and are never spiny. Specialists use several technical terms to denote parts of chiton valves, but they need not concern us here.

Tusk shells are altogether simpler in their construction than most other molluscan shells. The large opening is the *anterior orifice*, the smaller is the *posterior orifice*. Some species have a small *terminal pipe* projecting beyond the edge of the posterior orifice, which may or may not have a slot, a notch, or a slit in its edge.

The concave side of the shell is the *dorsal face*, the convex side is the *ventral face*. The ornament of tusk shells is of the simplest, longitudinal ribs being the most obvious and most important surface features. The identification of all but the best known tusk shells is a job for experts.

Most shells have at least a trace of color and some have a great deal of it. Often the color forms a distinctive pattern and is laid down by the mantle independently of the ornamental surface features. The colors laid down on a shell and the patterns they make undoubtedly provide important diagnostic features, and most of the descriptions of shells given in books give as much prominence to color and pattern as to ornament.

At the same time we can be easily led to believe that color and pattern are reliable features for identification purposes. Sometimes they are, but sometimes they are not. Certainly they are difficult to describe and just as certainly they are impossible to ignore, as the pictures in this book amply demonstrate.

SHELL CONDITION

In recent times, collectors and shell dealers have agreed on international shell-grading standards. In most instances specimens in "gem" condition are more desirable. Other factors, such as the accuracy and details of the collecting information (locality, habitat, date, etc.), are also important.

Gem. A perfect specimen, fully adult, normally colored, and without any visible breaks or flaws. Gastropods must have a perfect spire, with intact nuclear whorls, no broken spines, an outer lip without chips. Bivalves must have matching valves. Gastropods that are accompanied by their proper operculum and have the periostracum properly preserved intact are sometimes referred to as *super-gem*. No excessive oiling. Well cleaned inside and out.

Fine. An adult shell with only minor flaws or with not more than one shallow growth mark. Must have original color and gloss. A cone or volute lip may have one small chip or some roughness; a *Murex* or *Spondylus*, for instance, may have one or two minor spine breaks. No repairs, such as filed lips, mended knobs, or filled sponge holes. Well cleaned inside and out.

Good. A reasonably acceptable shell with few defects, such as growth marks, broken spines, a worn spire, or lip chips. Specimen may be subadult, but must display all the characteristics of the species. Well cleaned inside and quite well cleaned outside.

Poor. Worn or faded, with obvious breaks, loss of spines, eroded spire, or other loss of characters because of weathering or rough handling under adverse conditions. Referred to as "commercial grade" or "beach specimen" by some specimen dealers.

Juv. Juvenile or immature specimen. May be gem in the case of a half-grown specimen in a species that does not form a curled or flaring lip in the adult, such as *Cypraea* or *Strombus*.

W/O. With operculum (in gem quality the operculum must have come from the very specimen at hand).

Full Data. Detailed geographical origin, habitat, exact date of collecting, and original collector.

Basic Data. Localized geographical data as supplied by field dealers (Zamboanga, Philippines; or off Anping, Taiwan; Tampa Bay, Florida), year of collecting; original collector or dealer.

CONSERVATION

Studies have shown that no real menace to molluscan populations is caused by the collecting of specimens to satisfy the needs of museums, students and shell collectors. Pollution and massive disturbance of the habitats are the main causes of the decline of some shell beds, although commercial dredging for scallops and clams is known to reduce the numbers of shells temporarily.

Nonetheless, informed shell collectors are well aware of the need for restraint in collecting specimens. The influential national society, the American Malacological Union (A.M.U.), has endorsed the following guidelines for its members' field studies and collecting activities:

1. Observation and photography of mollusks in their natural habitats can yield important biological information and is often a more rewarding activity than the collecting of living animals. The A.M.U. encourages such observational research by both amateur and professional malacologists.

2. Living specimens should be collected only in those minimal numbers necessary to satisfy the requirements of the study. Dead shells often make valuable specimens, and their collection does not further endanger the population. The A.M.U. encourages the collection of dead shells, especially in cases where soft parts are not required for anatomical or physiological research.

3. Because detailed, properly documented material is needed to establish the ranges and habitats of all molluscan species and to ensure the success of efforts to conserve these animals, the A.M.U. urges all collectors to carefully label all specimens, photographs, and field notes with the precise locality, the exact date, and the full name of the observer and collector. It further recommends that arrangements be made for the deposition of such documentation and specimens in permanent museum reference collections. These may then be studied by other malacologists when the original studies are completed.

4. The results of field studies should be shared as widely as possible by means of educational exhibits, published papers, letters, seminars, and lectures.

5. The laws concerning collecting and trespass are to be known and obeyed by all.

Fieldworkers will obtain all necessary licenses and permits from official agencies and landowners before engaging in collecting or other activities.

The Hawaiian Malacological Society has issued a sheller's creed to be followed by collectors in tropical waters:

1. *Leave the live coral heads alone!* That's not where the shells live. Look in rubble, under the slabs, in the sand, and among the loose chunks.
2. *Put rock and coral back in place,* the way you found them, even in deep water. Things live under them. Continued exposure will kill them.
3. *Be alert for shell eggs and protect them.* They have a slim chance of survival, at best. Don't take the shell that is guarding them. Avoid disturbing breeding groups.
4. *Collect only what you really need.* Take time to examine your finds. Imperfect and immature shells are of no use to you. Leave them to grow and to breed.

GEOGRAPHICAL RANGES

In our brief treatment of each species we have given the areas where various species live. Space does not permit a detailed outline of the geographical range of each species. That information may be obtained in specialized faunal books or scientific monographs. The term *Indo-Pacific*, frequently used in this book, refers to the tropical marine province of the Indian and Western Pacific oceans. Many species have a range from the eastern shores of Africa and the Red Sea to the Central Pacific and northward to southern Japan.

On the other hand many species have limited ranges. As an example, *Aulica imperialis* is known only from the Sulu Sea in the southern Philippines. The Dragon Head Cowrie (*Cypraea caputdraconis*) has only been found on Easter Island in eastern Polynesia. It should also be remembered that some widespread species may have a specialized habitat, and, if the type of habitat occurs only rarely throughout the species range, the distribution of that shell will be scattered and sporadic.

Some marine species have been accidentally introduced to other parts of the world. Their present distribution may not conform to their normal range. The Atlantic Slipper Shell (*Crepidula fornicata*), originally an eastern United States species, is now abundant in northwest Europe. A few Japanese gastropods have established themselves in British Columbia and Washington.

MEASUREMENTS

Our measurements are given in English inches and in centimeters (with approximate equivalents). Our sizes represent the maximum length or diameter of an average adult specimen. Naturally, younger or immature specimens will be smaller than our stated size. Similarly, occasional specimens will exceed our stated dimensions. The known maximum sizes of many hundreds of species are recorded in Wagner and Abbott's *Standard Catalog of Shells*.

OBTAINING SHELLS

There are three major ways of acquiring shells for your collection: personal collecting, trading and purchasing. Some people prefer to limit their collections to what they have personally collected. Field notes and labels giving the exact date and place of collection add to the value of the specimens, for some day they may be added to the scientific collections of a research museum.

A detailed account of collecting and cleaning shells may be found in *How to Know and Study Shells*, a symposium of the American Malacological Union, as well as in dozens of shell books for beginners. In simplest terms, live mollusks may be cleaned of the soft parts by boiling them in water for about ten minutes, and then pulling the meat out with a bent pin or probe. Save the operculum of the gastropods. If you wish to preserve the animal, use seventy percent alcohol, not formaldehyde, as the latter is acidic and affects the calcareous shell.

A great deal of satisfaction may be obtained by corresponding and exchanging shells with collectors overseas. Their names may be obtained from shell magazines and shell club newsletters. A list of shell clubs appears in Tom Rice's *A Sheller's Directory of Clubs, Books, Periodicals and Dealers* (P.O. Box 33, Port Gamble, Washington 98364 USA). When exchanging, always try to send the very best specimens and supply good locality data.

Although a few shell shops carry specimen shells, most of today's sales of rare and unusual shells are through the mail-order business. Prices vary from one dealer to another, but in general perfect specimens bring higher prices than imperfect ones. A list of mail-order dealers may be found in Tom Rice's directory.

CARE OF SHELLS

Although shells are quite durable and have a great advantage over some other natural objects favored by collectors, they do require protection from dirt, excessive moisture, and direct sunlight.

Depending on the size of his pocketbook and the nature of his specimens a collector may arrange his collection in various ways. A few large specimens may be decoratively placed about a room or placed on shelving in a glass-fronted cabinet. A large collection containing several hundred species and bearing data labels is best housed in cabinets with sliding drawers. Many collectors place choice specimens in plastic boxes with a felt or cloth bottom. Plastic foam padding should be avoided because it will eventually break down and stick to the specimens. Cabinets made of oak should also be avoided because an acid fume will affect the surface of shells.

A certain amount of "face-lifting" of freshly collected specimens may be accomplished by soaking them in a fifty percent solution of bleach, later rinsing in warm water, and applying a very light touch of mineral oil. Do not treat shells with muriatic acid. This gives the shell surface an unnatural greasy appearance, and under a microscope one can see the resulting myriads of tiny pits.

In some countries where cool, humid conditions prevail, a bacterial blight (sometimes known as "Byne's disease") may attack glossy shells. The surface becomes chalky white and has a faint odor of vinegar. Badly damaged shells should be thrown away. Lightly affected shells should be soaked for a day in strong alcohol, then dried. Keep your collection in as dry and airy a place as possible.

A technical line drawing of a shell cabinet, labeled 'SHELL CABINET' in the top left corner. The drawing shows a perspective view of the cabinet's interior. The top surface is a flat rectangular panel. The side walls are composed of vertical slats or louvers. The bottom is a solid panel. A horizontal shelf or divider is shown in the middle of the cabinet. The drawing illustrates the internal structure and components of the shell cabinet.

Drawing of cabinet and catalog samples

PERSONAL CATALOG NUMBER	STANDARD CATALOG NUMBER	IDENTIFICATION (Genus, species and author)	LOCALITY DATA		

DATE OF COLLECTING	COLLECTOR OR SOURCE	NUMBER OF SPECIMENS	PRICE PAID OR VALUE	DATE CATALOGED	HABITAT; REMARKS

CATALOGING YOUR COLLECTION

A well-organized and fully documented collection of shells serves as a useful reference and identification tool. Its growth, permanency and value are enhanced by proper arrangement and curatorial care. Furthermore, such a collection adds to our scientific knowledge and may someday be a major contribution to a natural history museum or teaching institution. A catalog is most essential, and its most important purpose is to prevent the loss or mixing of locality data. If every specimen of each species from one locality (called a *lot*) bears the same number on the label and in the catalog entry, it can be returned to its proper tray in case of accidental spilling or mishandling. For example, if you collect several specimens of a periwinkle from a tide pool in Rockport, Maine, on May 13, 1977, this information should be entered in the catalog, and each shell should be given the same catalog number.

It is not necessary to have an identification of the species in order to catalog your specimens, for the real purpose is to associate a number with the more important information, such as *locality data*, *date of collecting*, *name of collector* and *habitat*. If the species name is written in pencil, it may be corrected or changed at a later date, although such updating is usually done only on the label.

Specimens should be numbered with black India ink with a fine-tipped pen. Shells too small to number may be placed in plastic boxes or in small glass or plastic vials, the latter either sealed with a snap lid or a plug of cotton. In each container place a small slip of heavy paper bearing the same number as that on the label and in the catalog entry.



Ringed Top-shell, *Calliostoma annulatum* (Lightfoot, 1786), from kelp beds off the Californian coast.

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Without the help of numerous private collectors, however, we should have been unable to illustrate many shells which have come on to the market only in recent years. Undoubtedly, too, the better quality specimens of many species are only to be found in private hands and we have been privileged to photograph many of these. We are especially thankful for the help and encouragement given to us by the owners of some of the finest shell collections in the United States and the United Kingdom.

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THE UNIVALVES
CLASS GASTROPODA

ORDER ARCHAEOGASTROPODA
SUPERFAMILY PLEUROTOMARIACEA
SLIT SHELLS
FAMILY PLEUROTOMARIIDAE

The large, primitive slit shells are limited to deep water, and most are quite rare in collections. There are 16 living species, all having a horny, circular operculum. The slit in the last whorl allows waste water to escape from the mantle chamber.



African Slit Shell (5") 12 cm
Pleurotomaria africana Tomlin, 1948. South Africa. Deep water; dredged. Moderately rare. *P. teramachii* Kuroda, 1955, is a Japanese subspecies, resembling it closely.



Hirasé's Slit Shell (4") 10 cm
Pleurotomaria hirasei Pilsbry, 1903. Off Japan; deep water. Uncommon. Rarely has albino shell. Best known species.



Beyrich's Slit Shell (4") 10 cm
Pleurotomaria beyrichii Hilgendorff, 1877. Off China and Japan; deep water; rare. Slit short; surface rough.



Rumphius's Slit Shell (8") 20 cm
Pleurotomaria rumphii Schepman, 1879. Off Taiwan and Japan; Indonesia. Deep water; uncommon. Umbilicus large and deep; slit very long.



Salmiana Slit Shell (4") 10 cm
Pleurotomaria salmiana Rolle, 1899. Off central Japan; deep water. Rare. *P. schmalzi* Shikama is a more pointed form.



Atlantic Slit Shell (3") 7 cm
Pleurotomaria atlantica Rios and Matthews, 1968. Off Brazil; deep water, 200 meters; rare. Slit narrow and short.



Pyramus Slit Shell (2") 5 cm
Pleurotomaria pyramus (F. M. Bayer, 1967). Off Guadeloupe, Lesser Antilles; 648 meters; rare. Spire low; slit short; fragile. Holotype illustrated.



Dawn Slit Shell (3.5") 8.5 cm
Pleurotomaria diluculum (Okutani, 1979). Off central Japan; deep water; rare. Umbilicus narrow; slit short. Holotype specimen illustrated.



Quoy's Slit Shell (2") 5 cm
Pleurotomaria quoyana Fischer & Bernardi, 1856. Gulf of Mexico—West Indies; deep water; rare. Slit short.



Jewel Slit Shell (1.7") 4 cm
Pleurotomaria gemma (F. M. Bayer, 1965). Off Barbados, Lesser Antilles; 300 meters; rare. Finely beaded. Slit short.



Lovely Slit Shell (3") 7 cm
Pleurotomaria amabilis (F. M. Bayer, 1963). Off West Florida and Lower Florida Keys; deep water; uncommon. Slit narrow and short.



Adanson's Slit Shell (7") 17 cm
Pleurotomaria adansoniana Crosse & Fischer, 1861. Bermuda; West Indies—Brazil. Deep water; uncommon. Umbilicus deep; slit very long.



King Midas's Slit Shell (3.5") 9 cm
Pleurotomaria midas (F. M. Bayer, 1965). Off central Bahama Islands; deep water; rare. Holotype illustrated.



Lucayan Slit Shell (1") 2.5 cm
Pleurotomaria lucaya (F. M. Bayer, 1965). Off Grand Bahama Island; deep water; rare. Holotype illustrated.

ABALONES or ORMERS
 FAMILY HALIOTIDAE

The abalones, sea ears or ormers have low flattish, spiral shells with an iridescent interior and with small holes for exhaling water. Adults lack an operculum. There are about 70 living species, most living on rocks in shallow water. The foot is edible and marketed in many countries.



Threaded Abalone (5") 13 cm
Haliotis assimilis Dall, 1878. S. Calif.—Baja Calif. Shallow water; common. 4 or 5 holes open. Syn.: *aulaea* Bartsch.



Threaded Abalone (5") 13 cm
Haliotis assimilis Dall, 1878. Interior view. Some consider this a southern subspecies of *H. kamtschatkana*. Exterior weakly threaded.



Green Abalone (8") 20 cm
Haliotis fulgens Philippi, 1845. S. Calif.—Baja Calif. Offshore to 10 meters; common. 5 or 6 holes open. Syn.: *splendens* Reeve; *revera* Bartsch.



Black Abalone (6") 15 cm
Haliotis cracherodii Leach, 1814. Oregon—Baja Calif. Intertidal; abundant. 5-8 holes open. Freaks lack holes. Surface smooth.



Japanese Abalone (4") 10 cm
Haliotis kamtschatkana Jonas, 1845. N. Calif.—Alaska; Japan. Intertidal to 5 meters; common. 4 or 5 holes open.



Pourtales's Abalone (1") 2.5 cm
Haliotis pourtalesii Dall, 1881. S. E. United States to Brazil. On rocks, offshore, 130 to 400 meters. Rare. Interior pearly white.



Red Abalone (12") 30 cm
Haliotis rufescens Swainson, 1822. Exterior view of polished shell. Meat of foot is marketed in Calif. Shell is used in jewelry.



Red Abalone (12") 30 cm
Haliotis rufescens Swainson, 1822. Oregon—Baja Calif. Intertidal to 150 meters on rocks; common. Exterior surface rough. 3 or 4 holes open.



Northern Green Abalone (5") 12 cm
Haliotis walallensis Stearns, 1899. Brit. Columbia—S. Calif. Uncommon; 1-20 meters. 5 or 6 holes open. Exterior with spiral threads. Holotype illustrated.



Pink Abalone (6") 15 cm
Haliotis corrugata Wood, 1828. S. Calif.—Baja Calif. Intertidal to 30 meters; abundant. 3 or 4 tubular holes open. Interior brilliant iridescent.



Pink Abalone (6") 15 cm
Haliotis corrugata Wood, 1828. S. Calif.—Baja Calif. Intertidal to 30 meters; abundant. 3 or 4 tubular holes open. Interior brilliant iridescent.



Rosy Abalone (2") 5 cm
Haliotis rosacea Reeve, 1846. West Africa. Intertidal to 2 meters; common. Exterior with fine decussated sculpture. Columella flat, wide. Syn.: *decussata* Philippi.



Lamellose Ormer (3") 8 cm
Haliotis tuberculata subspecies *lamellosa* Lamarck, 1822. Mediterranean and Adriatic Seas. Subtidal; common. Exterior rough. Many synonyms.



Tuberculate Ormer (3") 8 cm
Haliotis tuberculata L., 1758. Channel Is. to Canaries; Mediterranean. Intertidal to 5 meters; common. About 6-8 holes open. Spirally threaded.



Virgin Abalone (2.5") 7 cm
Haliotis virginea Gmelin, 1791. New Zealand. Subtidal on rocks; uncommon. Animal black with white foot.



Rainbow Abalone or Pau (5.5") 14 cm
Haliotis iris Martyn, 1784. New Zealand. Subtidal on rocks; common. Exterior dull, rough. Animal black. *H. iris* Gmelin is the same.



Austral Abalone (3") 8 cm
Haliotis australis Gmelin, 1791. New Zealand. Subtidal on rocks; moderately common. Strongly corrugated. Foot is orange.



Brazier's Abalone (1.2") 3 cm
Haliotis brazieri Angas, 1869. S. E. Australia. Subtidal on rocks; uncommon. Sometimes blood-red or with green zigzags.



Emma's Abalone (4") 10 cm
Haliotis emmae Reeve, 1846. South Australia—Tasmania. Subtidal on rocks; moderately common. 6 open holes.



Staircase Abalone (2.5") 7 cm
Haliotis scalaris Leach, 1814. South and West Australia. Subtidal on rocks; uncommon. Syn.: *tricastalis* Menke; *rubicundus* Gray.



Ruber Abalone (6") 16 cm
Haliotis ruber Leach, 1814. Southern Australia—Tasmania. Subtidal; abundant. Syn.: *naevosa* Martyn; *improbulum* Iredale.



Roe's Abalone (4.5") 12 cm
Haliotis roei Gray, 1826. Western Australia—Victoria. Offshore; commercially abundant. About 7 holes open.



Reddish-rayed Abalone (2") 5 cm
Haliotis coccoradiata Reeve, 1846. S. E. Australia. Intertidal; common. 6 or 7 holes open.



Scaly Australian Abalone (2.5") 6 cm
Haliotis squamata Reeve, 1846. Western Australia. Subtidal on rocks; common. 7 or 8 holes open.



Canaliculate Abalone (1.5") 4 cm
Haliotis parva L., 1758. South Africa. Intertidal, uncommon. 6 holes open. Syn.: *canaliculata* Lamarck; *carinata* Swainson.



Quekett's Abalone (1.5") 3.5 cm
Haliotis queketti E. A. Smith, 1910. Natal, South Africa. Subtidal on rocks; rare. 7 holes open, with high rims.



Midas's Abalone or Perlemoen (7") 17 cm
Haliotis midae L., 1758. Table Bay—Natal, South Africa. Subtidal on rocks; moderately common. Commercially fished.



Blood-spotted Abalone (3") 7 cm
Haliotis spadicea Donovan, 1808. Table Bay to Natal, South Africa. Intertidal on rocks; common. Syn.: *sanguinea* Hanley.



Japanese Abalone (2.5") 6 cm
Haliotis aquatilis Reeve, 1846. Japan—Korea. Intertidal to 20 m. on rocks; common. Alias *japonica* Reeve; *supertexta* Lischke; *exigua* Dunker.



Giant Abalone (8") 20 cm
Haliotis gigantea Gmelin, 1791. Japan—Korea. Subtidal on rocks to 20 m.; common. Commercially fished.



Disk Abalone (6") 15 cm
Haliotis discus Reeve, 1846. Japan, Korea, N. China. On rock, subtidal to 20 m. Very common; commercial seafood.



Donkey's Ear Abalone (2.5") 6 cm
Haliotis asinina L., 1758. S. W. Pacific. Subtidal, shallow water; abundant. Color variable. Foot large.



Close-sculptured Abalone (2.5") 6 cm
Haliotis crebrisculpta Sowerby, 1914. Japan—N. Australia. Intertidal on rocks; moderately common. Syntype illustrated.



Variously Colored Abalone (3") 8 cm
Haliotis diversicolor Reeve, 1846. S.W. Pacific. Subtidal on rocks; common. Color variable. Syn.: *gruneri* Philippi; *tayloriana* Reeve.



Glistening Abalone (2") 5 cm
Haliotis glabra Gmelin, 1791. Philippines—N. Australia. Intertidal on rocks; common. Syn.: *picta* Röding, 1798.



Jacna Abalone (0.5") 1.2 cm
Haliotis jacnensis Reeve, 1846. Philippines. Subtidal on rocks; uncommon. Coarse spiral ribs. *H. jacnaensis* is a misspelling.



Oval Abalone (1.5") 4 cm
Haliotis ovina Gmelin, 1791. Southern Japan—N. Australia. Intertidal on rocks; common. Interior silvery. Syn.: *latilabris* Philippi.



Planate Abalone (1.7") 4 cm
Haliotis planata Sowerby, 1883. S. W. Pacific. Intertidal on rocks; uncommon. Spire usually flat, eroded. 5 holes open.



Most Beautiful Abalone (1") 2.5 cm
Haliotis pulcherrima Gmelin, 1791. Eastern Polynesia. Offshore, shallow water. Locally common.



Variable Abalone (3") 7 cm
Haliotis varia L., 1758. Indo-Pacific. Subtidal on rocks. Widespread and common. Variable coloration. Syn.: *semistriata* Reeve.



Elegant Abalone (3") 7 cm
Haliotis elegans Philippi, 1874. Western Australia. Offshore, on rocks. Uncommon to rare.



Smooth Australian Abalone (6") 15 cm
Haliotis laevigata Donovan, 1808. South Australia. Offshore shallow water. Common. Syn.: *albicans* Q. & G.; *excisa* Gray.



Whirling Abalone (2.5") 6 cm
Haliotis cyclobates Péron, 1816. South Australia and Victoria. On rocks and shells, subtidal to 30 m; common. Syn.: *excavata* Lamarck.



Conical Pore Abalone (8") 20 cm
Haliotis conicopora Péron, 1816. Southern Australian rocky coasts. Subtidal; common. Top flat. Syn.: *cunninghami* Gray and *granti* Pritchard and Gatliff.



Dall's Abalone (2") 5 cm
Haliotis dalli Henderson, 1915. Galapagos;
West Colombia. 20 to 80 m; uncommon to
rare.



Dohrn's Abalone (2") 5 cm
Haliotis dohrniana Dunker, 1863. New
Hebrides to Indonesia. Rocks in shallow
water; uncommon.



Semiplicate Abalone (2.5") 6 cm
Haliotis semiplicate Menke, 1843. Western
Australia. Shallow water; uncommon. 6 or
7 holes open.



Squamose Abalone (2") 5 cm
Haliotis squamosa Gray, 1826. Western
Australia. Subtidal rocks; common.



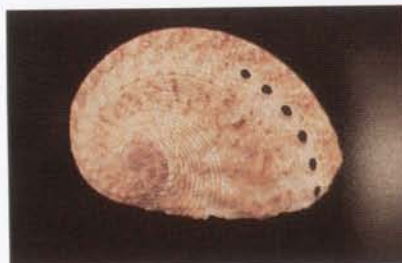
Lord Howe Abalone (1.5") 3.5 cm
Haliotis howensis Iredale, 1929. Eastern
Australia; Lord Howe Island; uncommon
to rare.



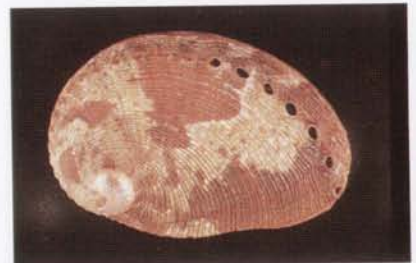
Mimic Abalone (1.5") 3.5 cm
Haliotis ethologus Iredale, 1927. N. E. Aus-
tralia. Subtidal; uncommon.



Honey Abalone (1.5") 3.5 cm
Haliotis melculus Iredale, 1927. Queens-
land, Australia. Offshore; uncommon.



Shield Abalone (1.5") 3.5 cm
Haliotis ancile Reeve, 1846. Gulf of Suez,
N.W. Indian Ocean. Subtidal; uncommon.



Splendid Abalone (3") 5 cm
Haliotis speciosa Reeve, 1846. South Africa.
Subtidal rocks; common.



Many-holed Abalone (2.5") 7 cm
Haliotis multiperforata Reeve, 1846. Indian
Ocean. Intertidal rocks; uncommon.



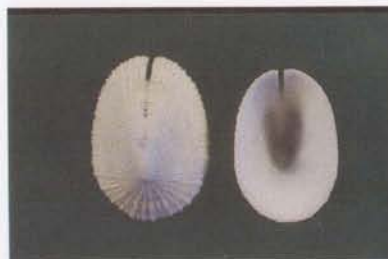
Lovely Abalone (2.5") 6 cm
Haliotis venusta Adams & Reeve, 1850.
South China Sea. Intertidal rocks; locally
uncommon.



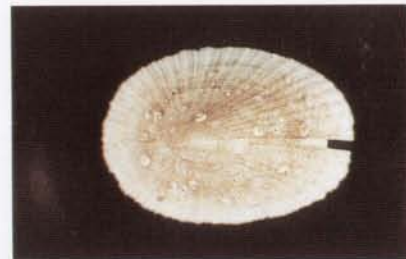
Hargraves's Abalone (3") 7 cm
Haliotis hargravesi Cox, 1869. Eastern Aus-
tralia. Subtidal rocks; uncommon.

KEYHOLE LIMPETS
SUPERFAMILY
FISSURELLACEA

These primitive limpets have two feathery gills. They live on rocks below the low-tide mark in most parts of the world. A few are deep-sea dwellers. Most have a natural hole at the top (Fissurellidae), but some have only a slit or weak indentation at the front end. In some, the mantle covers the shell. All are vegetarians, and they shed their floating eggs in the water. None has an operculum.



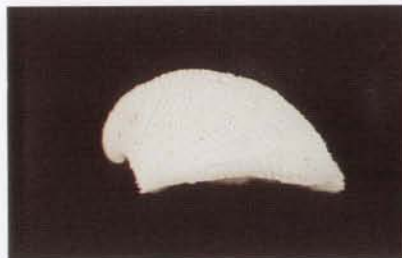
Striated Emarginula (0.5") 1.2 cm
Emarginula striatula Quoy & Gaimard, 1834. New Zealand. Subtidal on stones. Moderately common. Sculpture delicate.



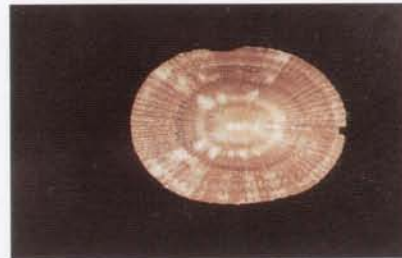
Crass Emarginula (1") 2.5 cm
Emarginula crassa J. Sowerby, 1812. N. W. Europe, West Indies. Offshore, on rocky bottom; uncommon. Edges thickened. Interior glossy white.



Dagger Emarginula (0.5") 1.2 cm
Emarginula sicula Gray, 1825. W. Europe—Mediterranean; Florida—West Indies. Offshore, 4-150 meters, uncommon.



Compressed Emarginula (0.5") 1.2 cm
Emarginula tuberculosa Libassi, 1859. Off Azores; Georgia—Brazil. Offshore to 225 meters; uncommon. Syn.: *compressa* Jeffreys; *guernei* Dautzenberg & Fischer.



Slit Emarginula (0.7") 1.8 cm
Emarginula fissurata Holten, 1802. Philippines. Intertidal, under rocks; uncommon. Syn.: *rubra* Lamarck.



Elegant Tugalia (0.7") 1.8 cm
Tugalia elegans Gray, 1843. New Zealand—eastern Australia. Intertidal, on rocks; common. Animal orange. Syn.: *parmorphoidea* Q. & G.



Short Shield Limpet (2") 5 cm
Scutus antipodes Montfort, 1810. New Zealand. Intertidal, rocks; common. Front truncated. Syn.: *ambiguus* Dillwyn; *breviculus* Blainville.



Hoof Shield Limpet (2") 5 cm
Scutus unguis (L., 1758). Indo-Pacific. Intertidal; common. Surface partially corrugated. Syn.: *corrugatus* Reeve.



Duck Shield Limpet (2") 5 cm
Scutus anatinus (Donovan, 1820). Australia. Intertidal on rocks; common. Animal black. Syn.: *elongatus* Blainville; *australis* Lamarck.



Eight-rayed Emarginula (1") 2.5 cm
Hemitoma octoradiata (Gmelin, 1791). Florida—Brazil. Subtidal on rocks; common. Notch weak in front. Animal blue and red.



Emarginate Emarginula (1") 2.5 cm
Hemitoma emarginata (Blainville, 1825). Florida—Caribbean. Subtidal on rocks; uncommon. Form *ostheimeriae* Abbott, 1958, is illustrated here.



Three-ribbed Emarginula (0.4") 1 cm
Hemitoma tricarinata (Born, 1778). Indo-Pacific. Subtidal on rocks; locally common. Interior green.



Remarkable Limpet (0.7") 1.8 cm
Clypidina notata (L., 1758). Indian Ocean. Intertidal; locally common. Exterior eroded.



Hooded Puncturella (1") 2.5 cm
Puncturella cucullata (Gould, 1846). Alaska—off Mexico. Subtidal to 35 meters; common. Interior glossy white.



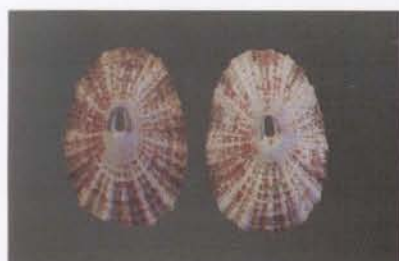
Broad Puncturella (1.5") 4 cm
Puncturella expansa (Dall, 1896). Baja Calif.—Panama; Galapagos. Offshore, deep water. Rare. Holotype illustrated.



Hawk Puncturella (1") 2.5 cm
Puncturella asturiana (Fischer, 1882). No. Carolina—West Indies; off Spain. Offshore, deep water; rare.



Rough Keyhole Limpet (2") 5 cm
Diodora aspera (Rathke, 1833). Alaska—W. Mexico. Intertidal to 9 meters, on stones and kelp weed; common. Syn.: *murina* Arnold.



Greek Keyhole Limpet (1") 2.5 cm
Diodora graeca (L., 1758). W. Europe; Mediterranean. Intertidal; on rocks; common. Syn.: *apertura* Montagu.



Cayenne Keyhole Limpet (1.5") 3.5 cm
Diodora cayenensis (Lamarck, 1822). Maryland—Brazil; Bermuda. Intertidal to 5 meters, on rocks; common. Syn.: *alternata* Say.



Lister's Keyhole Limpet (1.5") 3.5 cm
Diodora listeri (Orbigny, 1842). Florida—Brazil; Bermuda. Intertidal on rocks, common.



Dwarf Keyhole Limpet (0.6") 1.5 cm
Diodora minuta (Lamarck, 1822). S.E. Florida—Brazil. Subtidal on rocks, 1-25 meters; uncommon.



Say's Keyhole Limpet (0.7") 1.8 cm
Diodora sayi (Dall, 1899). S.E. Florida—Brazil. Offshore from 6-110 meters. Ribs equal in size.



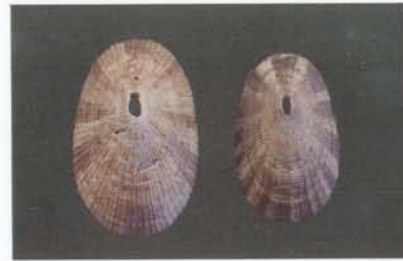
Dyson's Keyhole Limpet (0.7") 1.8 cm
Diodora dysoni (Reeve, 1850). Florida—Brazil; Bermuda. Subtidal on rocks; moderately common. Orifice black inside.



Green Keyhole Limpet (1") 2.5 cm
Diodora viridula (Lamarck, 1822). Lower Florida Keys—Caribbean. Intertidal on rocks; common in Lesser Antilles. Interior bluish gray.



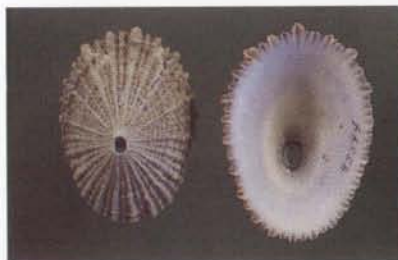
Tanner's Keyhole Limpet (2") 5 cm
Diodora tanneri Verrill, 1883. Eastern U.S.—West Indies. Offshore in deep water; uncommon.



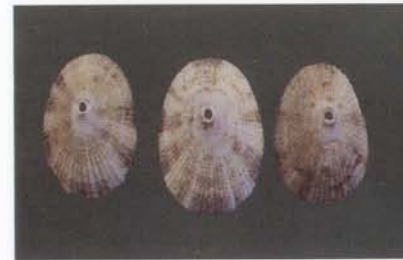
Patagonian Keyhole Limpet (1.2") 3 cm
Diodora patagonica Orbigny, 1847. Trinidad—Argentina. Subtidal on rocks; common.



Unequal Keyhole Limpet (1") 2.5 cm
Diodora inaequalis (Sowerby, 1835). Baja Calif.—Panama; Galapagos. Subtidal on rocks; uncommon.



Jukes's Keyhole Limpet (1.5") 4 cm
Diodora jukesii (Reeve, 1849). Southern Australia. Subtidal on rocks; common. 19-23 riblets.



Rüppel's Keyhole Limpet * (1") 2.5 cm
Diodora ruppelii (Sowerby, 1834). Red Sea—Cape of Good Hope. Intertidal on rocks; common. Syn.: *elevata* Dunker; *australis* Krauss.



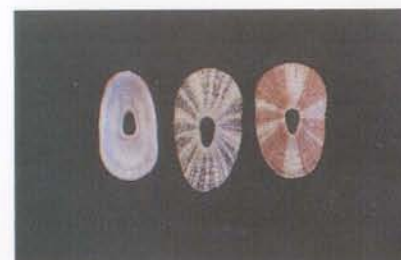
Cup Keyhole Limpet (1") 2 cm
Diodora calyculata (Sowerby, 1823). Knysna—Natal, South Africa. Intertidal, rocks; common. Septum behind inside of hole.



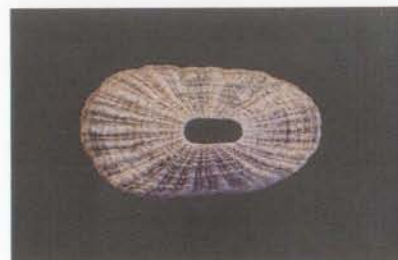
Elizabeth's Keyhole Limpet (1.8") 4.5 cm
Diodora elizabethae (E. A. Smith, 1901). Still Bay—Natal, South Africa. Subtidal on rocks. Moderately common.



Cancellate Fleshy Limpet (1") 2.5 cm
Lucapina suffusa (Reeve, 1850). So. Florida—Brazil; Bermuda. Subtidal on rocks; common. Hole blackish. Syn.: *cancellata* Sowerby.



File Fleshy Limpet (0.3") 7 mm
Lucapinella limatula (Reeve, 1850). No. Carolina—Brazil. Subtidal to 30 meters; common. Mantle covers shell.



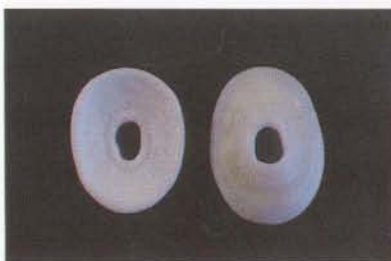
Hard-edged Fleshy Limpet (1") 2.5 cm
Lucapinella callomarginata (Dall, 1871) Calif.—Nicaragua. Under intertidal rocks; uncommon. Feeds on sponges.



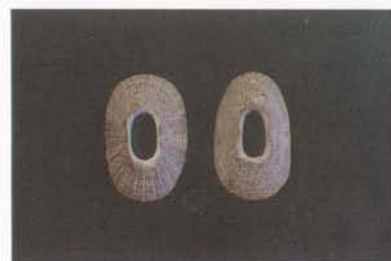
Great Keyhole Limpet (4") 10 cm
Megathura crenulata (Sowerby, 1825). Central Calif.—Baja Calif. Subtidal on rocks; common. Black-brown mantle covers shell.



Double-edge Keyhole Limpet • (1.5") 4 cm
Fissurellidea aperta (Sowerby, 1825). Table Bay—Natal, South Africa. Intertidal under rocks; common. Edge of shell is double.



South African Keyhole Limpet (0.6") 1.5 cm
Megatebennus africanus Tomlin, 1926. Still Bay—Natal, South Africa. Intertidal on rocks; common. Surface pitted.



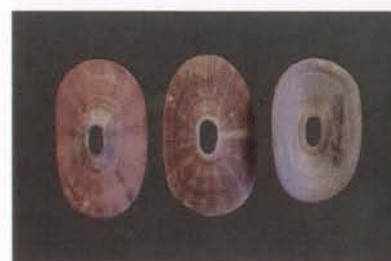
Two-spotted Keyhole Limpet • (0.7") 1.8 cm
Megatebennus bimaculatus (Dall, 1871). Alaska—Baja Calif. Under stones at low tide; common. Yellow or red animal covers shell.



Tasmanian Slot Limpet (1") 2.5 cm
Foralepas tasmaniae (Sowerby, 1866). Southern Australia; Tasmania. Subtidal reefs to 30 meters; common. Syn.: *tasmanica* and *roseoradiata* T.-Woods.



Oblong Slot Limpet (1") 2.5 cm
Amblychilepas oblonga (Menke, 1843). Southern Australia. Subtidal to 12 meters; common.



Shield Slot Limpet (0.7") 1.8 cm
Amblychilepas scutella (Gmelin, 1791). South Africa. Intertidal on rocks; common. Ends turned up.



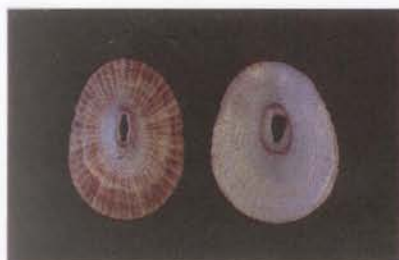
Narrow-end Keyhole Limpet (1") 2.5 cm
Fissurella angusta (Gmelin, 1791). Florida Keys—West Indies. Intertidal rocks; common. End narrowing.



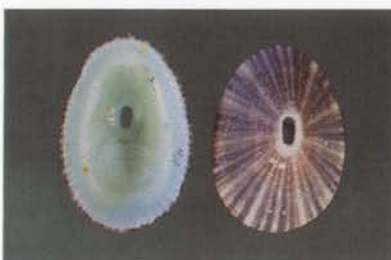
Barbados Keyhole Limpet (1") 2.5 cm
Fissurella barbadensis (Gmelin, 1791). So. Florida—Brazil; Bermuda. Intertidal, oceanic rocks; abundant in West Indies.



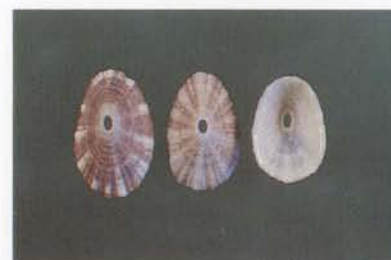
Dilated Slot Limpet (0.5") 1.2 cm
Macroschisma dilatatum (A. Adams, 1851). South Japan. Subtidal to 150 meters; common.



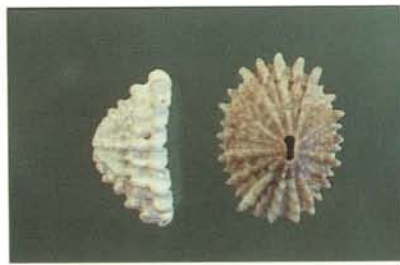
Wobbly Keyhole Limpet (1") 2.5 cm
Fissurella fascicularis Lamarck, 1822. S. E. Florida—West Indies. In potholes in intertidal zone. Locally common. Ends turned up.



Rayed Keyhole Limpet (1.5") 3.5 cm
Fissurella nimbosa (L., 1758). Puerto Rico—Brazil. Intertidal rocks; common. Keyhole not black-lined.



Rosy Keyhole Limpet (1") 2.5 cm
Fissurella rosea (Gmelin, 1791). S. E. Florida—Brazil. On rocks; uncommon. Callus around hole has pinkish line. Syn.: *radiata* Lamarck.



Knobby Keyhole Limpet (1.2") 3 cm
Fissurella nodosa (Born, 1778). West Indies. Intertidal shore rocks; abundant. Interior pure-white. Syn.: *rudis* Röding.



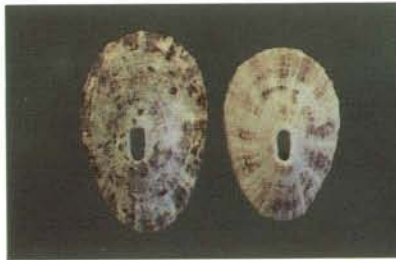
Cloudy Keyhole Limpet (1") 2.5 cm
Fissurella nubecula (L., 1758). W. Europe—Mediterranean; Cape Verde Is. Subtidal on rocks; common.



Volcano Keyhole Limpet (1") 2.5 cm
Fissurella volcano Reeve, 1849. Calif.—Baja Calif. Intertidal rocks; common. Foot yellow; mantle with red stripes.



Green Panama Keyhole Limpet (2") 5 cm
Fissurella virescens Sowerby, 1835. Gulf of Calif.—Peru; Galapagos Is. Intertidal rocks; common.



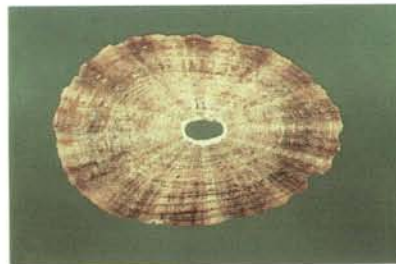
Natal Keyhole Limpet (1.5") 3 cm
Fissurella natalensis Krauss, 1848. South Africa—Mozambique. Intertidal rocks; common.



Black Keyhole Limpet (4") 10 cm
Fissurella nigra Lesson, 1830. Peru—Chile. Intertidal rocks; common. Interior white. Syn.: *latemarginata* Sowerby, *grandis* Sowerby.



Rising Sun Keyhole Limpet (2.5") 6 cm
Fissurella oriens Sowerby, 1835. Chile to Magellan Straits. Subtidal rocks to 15 meters; common.



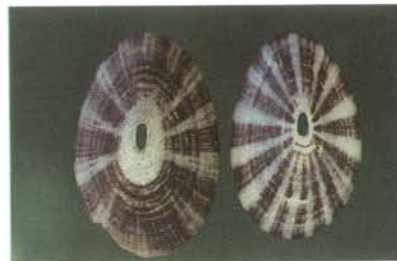
Grand Keyhole Limpet (4") 10 cm
Fissurella maxima Sowerby, 1835. Peru—Chile. Subtidal rocky reefs; common. Interior white, with purple margin.



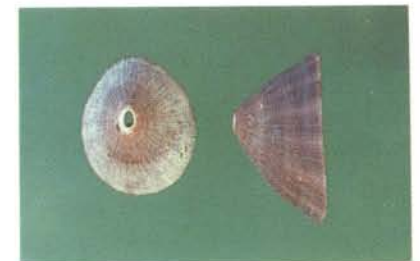
Thick Keyhole Limpet (3") 8 cm
Fissurella crassa Lamarck, 1822. Peru—Chile. On intertidal rocks; common. Syn.: *clupeiformis* Sowerby.



Costate Keyhole Limpet (2.6") 7 cm
Fissurella costata Lesson, 1830. Peru—Chile. On intertidal rocks among red algae. Common. Syn.: *rudis* Deshayes; *chilensis* Sowerby.



Painted Keyhole Limpet (4") 10 cm
Fissurella picta (Gmelin, 1791). Ecuador—Magellan Straits. Intertidal rocks; common. Interior white. Syn.: *darwini* Reeve, 1845.



Peruvian Keyhole Limpet (1") 2.5 cm
Fissurella peruviana Lamarck, 1822. Peru—Chile. On intertidal rocks; common. Interior white with red margin.

SUPERFAMILY PATELLACEA
TRUE LIMPETS
FAMILY PATELLIDAE

Limpetlike, flat to conical snails, without a hole at the apex of the shell. The family Patellidae contains shore-rock dwellers, such as *Patella*, *Cellana* and *Nacella*. Gill cordon encircles inner mantle edge. Family Acmaeidae has one gill plume at front end. All are vegetarians. Many wander about the rocks at night, but return to their original site at dawn. Many species.



Common European Limpet (2.5") 6 cm
Patella vulgata L., 1758. Norway to Spain. Intertidal on rocks; abundant. Very variable. Many synonyms.



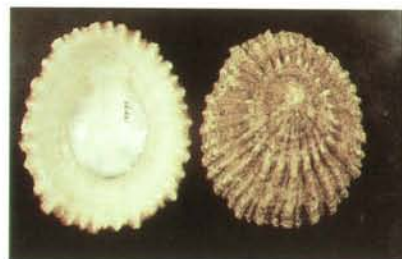
Common European Limpet (2.5") 6 cm
Patella vulgata L., 1758. Side views of a low-spired form (left) and a high-spired form (right). Edible.



European China Limpet (2") 5 cm
Patella aspera Röding, 1798. British Isles and France. Intertidal on rocks; common. Ribs sharper than *vulgata*. Syn.: *aspera* Lamarck.



Rayed Mediterranean Limpet (2") 5 cm
Patella caerulea L., 1758. Mediterranean to Azores. Intertidal; abundant. Interior with 7-9 bluish rays. Syn.: *tarentina* Lamarck.



Ribbed Mediterranean Limpet (2.5") 6 cm
Patella ferruginea Gmelin, 1791. Mediterranean. Intertidal rocks; common. Margin corrugated. Syn.: *lamarckii* Payraudeau.



Safian Limpet (3") 7 cm
Patella safiana Lamarck, 1819. Algeria to West Africa. Intertidal on rocks, common. Internal scar elongate. Syn.: *kraussii* Dunker.



Giant Mexican Limpet (14") 35 cm
Patella mexicana Broderip & Sowerby, 1829. Gulf of Calif. to Peru. Subtidal on rocks; common. Syn.: *gigantea* Lesson; *maxima* Orbigny.



Giant Mexican Limpet (14") 35 cm
Patella mexicana Broderip & Sowerby. Internal view. Usual length about (6") 15 cm. Largest known limpet.



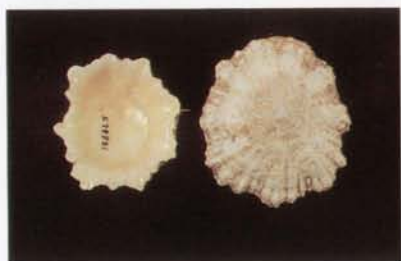
Kermadec Limpet (6") 15 cm
Patella kermadecensis Pilsbry, 1894. Kermadec Is., off New Zealand. Subtidal; locally common. Syn.: *pilsbryi* Brazier.



Neglected Limpet (4") 10 cm
Patella laticostata Blainville, 1825. S. W. Australia. Intertidal rocks; common. Syn.: *neglecta* Gray.



Chapman's Limpet (0.7") 1.8 cm
Patella chapmani Tenison-Woods, 1876. Southern Australia; Tasmania. Intertidal rocks; common. Syn.: *octoradiata* Hutton; *alba* T.-Woods.



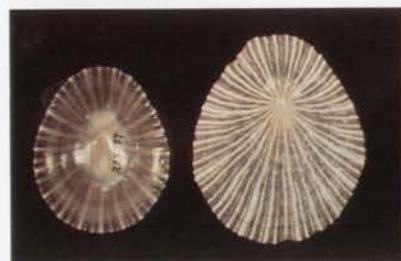
Star-shaped Limpet (1") 2.5 cm
Patella flexuosa Quoy & Gaimard, 1834. Malaya to Polynesia. Intertidal on coral stones; common. Syn.: *stellaeformis* Reeve, *paumotensis* Gould.



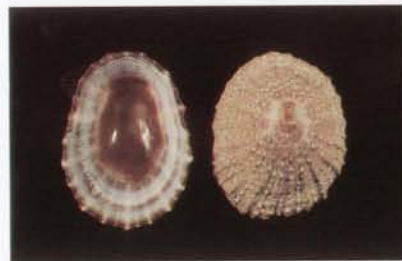
Spoon Limpet (2.5") 6 cm
Patella cochlear Born, 1778. Port Nolloth—Natal, South Africa. Intertidal rocks; abundant.



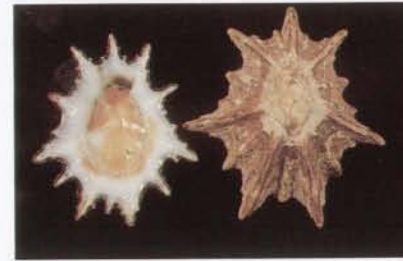
South African Variable Limpet (1.5") 4 cm
Patella concolor Krauss, 1848. Port Elizabeth—Natal, South Africa. Intertidal shore; common. Syn.: *variabilis* Krauss (not Röding).



South African Variable Limpet (1.5") 4 cm
Patella concolor Krauss, 1848. South Africa. Color form *polygramma* Tomlin, 1931, illustrated here.



Granular Limpet (2.5") 6 cm
Patella granularis L., 1758. All South Africa. Shore rocks; abundant. Syn.: *morbida* Reeve; *natalensis* Krauss.



Long-ribbed Limpet (2.5") 6 cm
Patella longicosta Lamarck, 1819. Cape to Natal, South Africa. Shore rocks; common. Syn.: *decemcostata* E. A. Smith.



Cinnabar Limpet (2") 5 cm
Patella miniata Born, 1778. Port Nolloth—Natal, South Africa. Intertidal shore; common. Bleaches to bright pink. Syn.: *pulchra* Lightfoot.



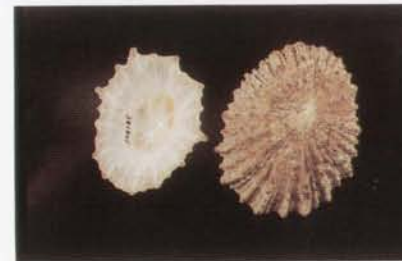
South African Eye Limpet (4") 10 cm
Patella oculus Born, 1778. West South Africa. Flattish; 5 prongs at back end. Interior brown. Syn.: *scutellaris* Lamarck. Common.



Tabular Limpet (5") 13 cm
Patella tabularis Krauss, 1848. South Africa. Shore rocks; common. Largest limpet in Africa. Syn.: *patriarcha* Pilsbry.



Sandpaper Limpet (3") 7 cm
Patella granatina L., 1758. Port Nolloth—False Bay, South Africa. Shore rocks; cold water; common. Thin-shelled.



Barbara Limpet (3") 8 cm
Patella barbara L., 1758. All South Africa. Intertidal rocks; common. Variable in height and color. Syn.: *spinifera* Lamarck.



Blue-rayed Limpet (1") 2.5 cm
Helcion pellucidus (L., 1758). Norway—Portugal. Offshore to 8 meters on brown seaweeds; common. Syn.: *laevis* Pennant.



Common Turtle Limpet (3") 7 cm
Cellana testudinaria (L., 1758). Malaya—S. W. Pacific. Subtidal on blackish rocks; abundant. Syn.: *insignis* Dunker; *rumphii* Blainville.



Indo-Pacific Limpet (1") 2.5 cm
Cellana radiata (Born, 1778). East Africa—eastern Polynesia—Japan. Variable in color. Margin finely toothed. Syn.: *rota* Gmelin.



Denticulate Limpet (2.5") 6 cm
Cellana denticulata (Martyn, 1784). No. New Zealand. Rocky shores; abundant. Syn.: *imbricata* Reeve; *reevei* Hutton.



Striped Limpet (2.5") 6 cm
Cellana strigilis (Hombron & Jacquinot, 1841). So. New Zealand. Rocky shores; abundant. Several subspecies; *redimiculum* Reeve illus. here.



Common New Zealand Limpet (1.5") 4 cm
Cellana radians (Gmelin, 1791). No. New Zealand. Intertidal rocks. Common.



Bonin Island Limpet (3") 7 cm
Cellana mazatlanica (Sowerby, 1839). Intertidal rocks; abundant. Syn.: *boninensis* Pilsbry; *nigrisquamata* Reeve.



Japanese Grata Limpet (1.5") 4 cm
Cellana grata (Gould, 1859). Japan and Korea. Rocky shores; abundant. Syn.: *stearnsii* Pilsbry; *eucosmius* Pilsbry, 1895, not 1891.



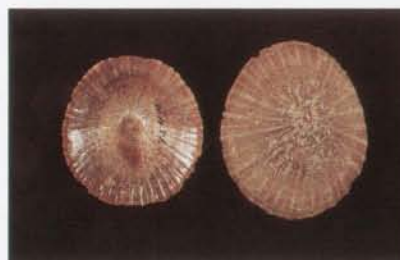
Hawaiian Limpet; Opihi (1.5") 3 cm
Cellana exarata (Reeve, 1854). Hawaiian Islands. Intertidal rocks; locally common. Eaten in Hawaii.



Ariel Limpet (2") 5 cm
Cellana tramoserica (Holten, 1802). Southern and east Australia; Tasmania. Intertidal rock shores; abundant. Syn.: *ariel* Iredale; *sontica* Iredale.



Patagonian Copper Limpet (2") 5 cm
Nacella deaurata (Gmelin, 1791). Patagonia; Falkland Is. Intertidal to offshore on seaweed; common. Syn.: *aenea* Martyn. In subgenus *Patinigera*.



Chilean Copper Limpet (2") 5 cm
Nacella clypeator (Lesson, 1831). Chile. Subtidal on seaweeds; common. Thin-shelled.



Magellanic Copper Limpet (2") 5 cm
Nacella magellanica (Gmelin, 1791). Straits of Magellan; Falkland Is. Intertidal to offshore on seaweeds; abundant. Syn.: *metallica* Roch. & Mab.



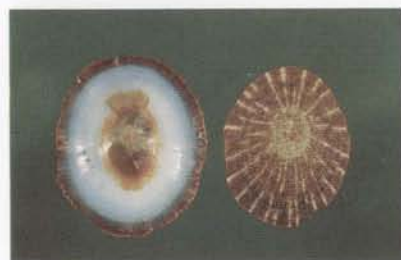
South Polar Limpet (2") 5 cm
Nacella concinna (Strebel, 1908). Islands around Antarctica. Intertidal to 100 meters; on large seaweeds; common. Syn.: *polaris* Homb. & Jacq. (not Röding).



Tierra del Fuego Limpet (2") 5 cm
Nacella fuegiensis (Reeve, 1855). Tierra del Fuego; Falkland Is., So. Georgia Is. Subtidal, common. Thin-shelled.

TRUE LIMPETS FAMILY ACMAEIDAE

Many dozens of species occur in great numbers on rocks throughout the world, especially on the Pacific coast of North America. The muscle scar on the inner side is horseshoe-shaped and open in front. One gill present. The shape of the shell will sometimes vary depending upon the type of habitat. Most live on intertidal rocks, but often are found on other snail shells and on seaweeds. The foot is edible. There is no operculum.



Half-white Limpet (1") 2.5 cm
Scurria mesoleuca (Menke, 1851). West Mexico—Ecuador. Intertidal on rocks; common. Syn.: *diaphana* Reeve; *vespertina* Reeve.



Zebra Limpet (2") 5 cm
Scurria zebrina (Lesson, 1831). Chile. Intertidal rocks; common. 12 radiating ribs. Syn.: *concepcionensis* Lesson.



Green Chilean Limpet (2.5") 6 cm
Scurria viridula (Lamarck, 1819). Peru and Chile. On chitons and subtidal rocks; common. Syn.: *petrei* Orbigny.



Schrenck's Limpet (1") 2.5 cm
Notoacmea schrenckii (Lischke, 1868). Japan, Korea, north China. Intertidal on rocks; abundant.



Felt-cap Limpet (1") 2.5 cm
Notoacmea pileopsis (Quoy & Gaimard, 1834). New Zealand. Intertidal on rocks; common. Syn.: *cellanoides* Oliver; *sturnus* Homb. & Jacquinot.



Atlantic Plate Limpet (1") 2.5 cm
Collisella testudinalis (Müller, 1776). Arctic Seas—New York; Alaska—Oregon. Intertidal rock pools; common. Rarely elongate (on eelgrass).



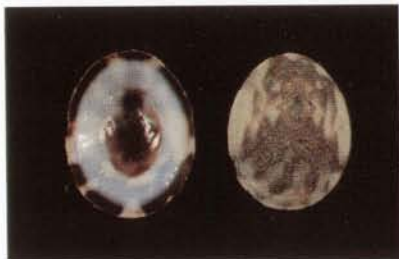
Black-ribbed Limpet (0.6") 1.5 cm
Collisella leucopleura (Gmelin, 1791). Florida Keys—West Indies. Subtidal on rocks or underside of whelks; common. Syn.: *jamaicensis* Gmelin.



Spotted Atlantic Limpet * (0.6") 1.5 cm
Patelloida pustulata (Helbling, 1779). Florida Keys (rare) & West Indies (common). Intertidal shore rocks. Elongate pink form (on turtle grass).



Abrolhos Island Limpet (0.8") 2 cm
Collisella abrolhosensis (Petuch, 1979). Off east coast of Brazil. On subtidal rocks; locally common. Paratypes illustrated.



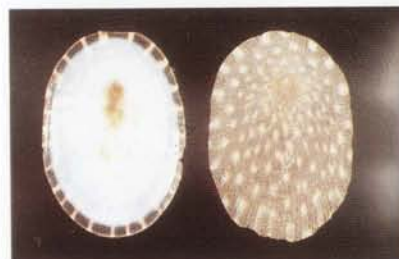
California File Limpet (1") 2.5 cm
Collisella limatula (Carpenter, 1864). Puget Sound, Wash.—Baja Calif. Intertidal rocks; common. Radial rows of minute beads. Interior edge solid brown band.



California Shield Limpet (1") 2.5 cm
Collisella pelta (Rathke, 1833). Alaska—Baja Calif. Intertidal rocks; abundant. 25 weak riblets. Interior edge checkered in black & cream.



California Finger Limpet (1.5") 3 cm
Collisella digitalis (Rathke, 1833). Alaska—West Mexico. Wave-dashed rocks; abundant. 15-25 coarse ribs. Syn.: *textilis* Gould.



Dall's Limpet (1.5") 3 cm
Collisella dalliana (Pilsbry, 1891). Gulf of California. On rocks at mid-tide zone. Uncommon.



California Rough Limpet (1.5") 4 cm
Collisella scabra (Gould, 1846). Southern Oregon—Baja Calif. Upper tide level on flat rocks; abundant. Interior center coarse and dull.



Antillean Limpet (1") 2.5 cm
Collisella antillarum (Sowerby, 1831). West Indies (rarely Florida Keys). Intertidal rocks; common. Syn.: *candeana* Orbigny.



Striate Limpet (1.5") 4 cm
Collisella striata (Quoy & Gaimard, 1834). East Indies; Philippines. Intertidal on rocks. Syn.: *borneensis* Reeve.



White-cap Limpet (1") 2.5 cm
Acmaea mitra Rathke, 1833. Alaska—Baja Calif. Subtidal on rocks; common. Sometimes covered with knobby growths.



Giant Owl Limpet (3.5") 9 cm
Lottia gigantea (Sowerby, 1834). Calif.—Baja Calif. On rocks near high-tide line; very common. Usually solid brown-gray, rarely maculated (as shown here).



High-ribbed Limpet (1") 2.5 cm
Patelloida alticostata (Angas, 1865). Southern Australia; Tasmania. Intertidal rocks; abundant. Feeds on sea lettuce, *Ulva*.



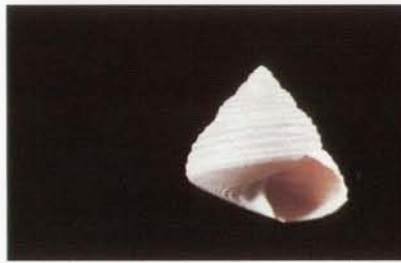
Pacific Sugar Limpet (1.5") 4 cm
Patelloida saccharina (L., 1758). South Western Pacific—Melanesia. Intertidal rocks; abundant. Syn.: *stellaris* Quoy & Gaimard.



Blue-ringed Limpet (0.8") 2 cm
Atalacmea fragilis (Sowerby, 1823). New Zealand. Under smooth rocks, intertidal; moderately common. Used in shellcraft.

TOP-SHELLS
FAMILY TROCHIDAE

This is a very large worldwide family with numerous genera and hundreds of species. Most are top-shaped, have an iridescent interior and a round, many-whorled, horny operculum. They occur from tidal rock pools to the deepest portions of the oceans. Most feed on seaweeds but many eat bryozoans and sponges.



Puppert Margarite (0.3") 7 mm
Margarites pupillus (Gould, 1849). Alaska—Calif. Subtidal rocks to 30 m; common. Umbilicus minute.



Tower of Babel Top (2") 5 cm
Basilissa babelica Dall, 1907. Off eastern coast of Japan; deep water. Rare. Shell on left is the holotype.



Glistening Margarite (0.6") 1.5 cm
Bathymophila nitens (Dall, 1881). Off Baja Calif., deep water, 900 m. Rare. Holotype specimen.



Four-keeled Margarite (0.5") 1.2 cm
Euchelus quadricarinatus (Holten, 1802). Indo-Pacific. Under subtidal rocks; common. Syn.: *tricarlinatus* Lamarck.



Roughened Margarite (0.7") 1.8 cm
Euchelus aspersus (Philippi, 1846). So. Australia—Tasmania. Reefs below low tide to 300 m; common. Syn.: *baccatus* Menke.



Blackish Margarite (0.6") 1.5 cm
Euchelus atratus (Gmelin, 1791). Indo-Pacific. Intertidal, under rocks; common. Syn.: *canaliculatus* Lamarck.



Imbricate Margarite • (1.2") 3 cm
Granata imbricata (Lamarck, 1816). So. Australia; on rocky reefs, subtidal. Common. In family Stomatellidae.



Mysticus Margarite • (0.3") 7 mm
Hybochelus mysticus (Pilsbry, 1889). S. W. Pacific. Subtidal, under rocks. Moderately common. In family Stomatellidae.



Subangular Margarite (0.5") 1.2 cm
Minolia subangulata Kuroda and Habe, 1952. Japan. Sandy bottom, 50-200 m; common. Syn.: *angulata* Yokoyama.



Paradox Top (0.5") 1.2 cm
Chrysostoma paradoxum (Born, 1778). Indo-Pacific. Intertidal rocks; abundant. Shell thick, surface smooth.



West Indian Top (3") 7 cm
Cittarium pica (L., 1758). Caribbean. Subtidal rocks near open ocean; common. Horny operculum greenish black. *Livona* is a synonym. Used in soups.



Changing Margarite (1.5") 4 cm
Bathybembix aeola (Watson, 1879). Japan and off east China. Deep water; uncommon.



Baird's Margarite (1.5") 4 cm
Bathybembix bairdii (Dall, 1889). Alaska—Chile. Deep water; 10 to 1200 m. Uncommon.



Humboldt's Margarite (1.5") 4 cm
Bathybembix humboldti Rehder, 1971. Off Chile. Deep water. Rare.



Silvery Margarite (1.5") 4 cm
Bathybembix argenteonitens (Lischke, 1872). Japan and east China. Sandy bottom, 50-400 m; common.



Crump's Margarite (1.2") 3 cm
Bathybembix crumpii (Pilsbry, 1893). South half of Japan. Sandy bottom, 50-400 m. Uncommon.



Korean Margarite (1.2") 3 cm
Turcica coreensis Pease, 1860. Japan; Korea, east China. Sandy bottom; 50-300 m. Uncommon.



Giant Imperial Margarite (2") 5 cm
Lischkeia imperialis (Dall, 1881). Off Florida and Caribbean. Deep water, 60-360 m. Rare. Syn.: *deichmannae* Bayer.



Smooth Silver Margarite (2") 5 cm
Bathybembix convexiusculus (Yokoyama, 1920). Japan. Deep water; uncommon.



Shinagawen Top (1.5") 4 cm
Calliostoma shinagawensis Tokunaga, 1902. Japan; east China. Deep water. Moderately common.



Japan Jewel Top (0.7") 1.8 cm
Cantharidus japonicus (A. Adams, 1853). Southern Japan. Subtidal to 20 m; on seaweeds; common. Syn.: *hilaris* Lischke.



Rambur's Jewel Top (0.3") 7 mm
Prothalotia ramburi (Crosse, 1864). South Australia. Intertidal on weeds. Common.



Dusky Jewel Top (0.3") 7 mm
Cantharidus infuscatus (Gould, 1861). Japan; offshore on gravel; 5-30 m. Common.



Beautiful Jewel Top (0.6") 1.5 cm
Prothalotia pulcherrima (Wood, 1828). South Australia. Intertidal weeds; common. Syn.: *preissii* Menke; *puella* Philippi; *mariae* Tenison-Woods.



Otto's Spiny Margarite (0.6") 1.5 cm
Calliotropis otto (Philippi, 1844). Nova Scotia to No. Carolina. Offshore; 100-200 m; common. Syn.: *regalis* Verrill, holotype illustrated.



Albatross Margarite (0.7") 1.8 cm
Calliotropis diomediae (Verrill, 1880). Off Massachusetts. Deep water, 3,000 m. Rare.

CALLIOSTOMA TOPS Genus *Calliostoma*

These beautiful top-shells are common around the world, and because of their curious shapes have been placed in various subgenera or related genera, such as *Maurea*, *Tristichotrochus* and *Ziziphinus*. There are several hundred species. Operculum horny and circular.



European Painted Top (1") 2.5 cm
Calliostoma zizyphinus (L., 1758). West Europe—Azores. Intertidal; on rocks; common. Syn.: *conuloide* Lamarck.



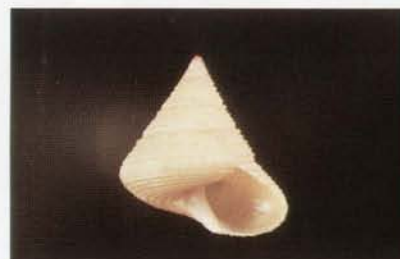
Gualteri's Top (0.6") 1.5 cm
Calliostoma gualterianum (Philippi, 1848). Mediterranean. Intertidal on weeds among rocks; common.



European Granular Top (1.2") 3 cm
Calliostoma granulatum (Born, 1778). Mediterranean to Canary Is. Offshore, 26-240 m. Common. Syn.: *papillosum* da Costa; *fragilis* Pulteney.



Ringed Top (1.2") 3 cm
Calliostoma annulatum (Lightfoot, 1786). Alaska to So. California. Offshore, 1-20 m. Common. Nucleus pink.



Variable Top (1") 2.5 cm
Calliostoma variegatum Carpenter, 1864. Alaska to So. California. Offshore, 30-800 m; Uncommon.



Palmer's Top (1") 2.5 cm
Calliostoma palmeri Dall, 1871. Gulf of California. Intertidal to 45 m; uncommon.



Glorious Top (1") 2.5 cm
Calliostoma gloriosum Dall, 1871. So. California. Subtidal to 50 m, in kelp weeds. Common. Nucleus white.



Channeled Top • (1.5") 3.5 cm
Calliostoma canaliculata (Lightfoot, 1786). Offshore on floating kelp weeds; common. Syn.: *doliarium* Holten. California.



Three-colored Top (0.7") 1.8 cm
Calliostoma tricolor Gabb, 1865. So. Calif. to Baja California. Offshore, 16-70 m; common. Sometimes axially streaked.



Western Ribbed Top (1") 2.5 cm
Calliostoma ligatum (Gould, 1849). Alaska to So. California. Intertidal to subtidal on rocks; common. Syn.: *costatum* Martyn.



Western Gem Top (0.7") 1.8 cm
Calliostoma gemmulatum Carpenter, 1864. California and Gulf of Calif. Intertidal, on rocks and wharf pilings; common. Syn.: *formosum* Carpenter.



Ringed Top * (1.2") 3 cm
Calliostoma annulatum (Lightfoot, 1786). Alaska to So. California. Offshore, 1-20 m. Common. Nucleus pink.



Australian Necklace Top (0.5") 1.2 cm
Calliostoma monile (Reeve, 1863). West Australia. Subtidal to 20 m; moderately common. Usually on blue sponges.



Subcarinata Top * (1") 2.5 cm
Calliostoma subcarinata (Swainson, 1855). Southern Australia; Tasmania. Subtidal to 14 m. Moderately common.



Keeled Australian Top (1.5") 4 cm
Calliostoma ciliare (Menke, 1843). West Australia. Offshore; uncommon.



Jujube Top (1") 2.5 cm
Calliostoma jujubinum (Gmelin, 1791). No. Carolina to Brazil. Under rocks, offshore from 1 to 30 m; common locally. Syn.: *tampaense* Conrad.



Adele's Top (0.7") 1.8 cm
Calliostoma adae Schwengel, 1951. Southeast Florida. In shallow water grass beds, 2 to 7 m. Locally common.



Sculptured Top (0.7") 1.8 cm
Calliostoma euglyptum (A. Adams, 1854). No. Carolina to east Mexico. Subtidal to 64 m, among rocks; moderately common.



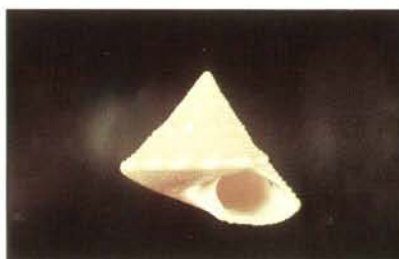
Baird's Top (1.3") 3 cm
Calliostoma bairdii Verrill and Smith, 1880. Massachusetts to Florida. Offshore 80 to 500 m. Uncommon. Holotype illustrated.



Psyche Top (0.8") 2 cm
Calliostoma bairdii psyche Dall, 1889. No. Carolina to Key West, Florida. Offshore, 60 to 260 m. Moderately common.



Rosewater's Top (1.3") 3 cm
Calliostoma bairdii rosewateri Clench and Turner, 1960. Lesser Antilles to Colombia. Deep water, 300 to 400 m. Rare. Paratypes illustrated.



Henderson's Top (1") 2.5 cm
Calliostoma bairdii hendersoni Dall, 1927. Florida Keys, 3 to 20 m. Among rubble. Uncommon. Holotype illustrated.



Dawn Top (2") 5 cm
Calliostoma aurora Dall, 1888. Off the Lesser Antilles from 280 to 1,140 m. Rare. Holotype illustrated.



Bullis's Top (1") 2.5 cm
Calliostoma bullisi Clench and Turner, 1960. Off eastern Brazil in 70 m. Rare. Paratype illustrated.



Hassler's Top (1.2") 3 cm
Calliostoma hassler Clench and Aguayo, 1939. East coast of Brazil. Offshore in 70 m; uncommon to rare. Holotype illustrated.



Panama Rainbow Top (0.2") 5 mm
Calliostoma iridium Dall, 1896. Gulf of Panama in 360 to 460 m; uncommon. Paratype illustrated.



Von Ihering's Top (1.5") 3.5 cm
Calliostoma militare von Ihering, 1907. Argentina. Dredged just offshore. Rare. Syn.: *amazonica* Finlay; *iheringi* Dall, holotype illus.



Spotted Brazilian Top (0.8") 2 cm
Calliostoma adpersum (Philippi, 1851). So. Brazil. Subtidal; uncommon. Syn.: *depictum* Dall.



Carcelles's Top (0.7") 1.8 cm
Calliostoma carcellesi Clench and Aguayo, 1940. Argentina. Offshore in 60 m. Rare. Holotype illustrated.



Bigelow's Top * (1") 2.5 cm
Calliostoma bigelowi Clench and Aguayo, 1938. Cuba, offshore from 300 to 460 m. Rare collector's item. Holotype illus. [This photo accidentally reversed].



Olsson's Top (0.7") 1.8 cm
Calliostoma olssoni Bayer, 1971. Off St. Vincent, West Indies. 230 m. Very rare. Holotype illustrated.



Atlantis Top (1.5") 3.5 cm
Calliostoma atlantis Clench and Aguayo, 1940. Off Pinar del Rio, Cuba, in 660 m. Known only from this holotype specimen.



Chocolate-lined Top (1") 2.5 cm
Calliostoma javanicum (Gmelin, 1791). So. Florida Keys and West Indies. On reefs, 1 to 35 m. Uncommon. Syn.: *zonamestum* A. Adams.



Springer's Top (1.4") 3 cm
Calliostoma springeri Clench and Turner, 1960. Gulf of Mexico, off Mississippi in 520 m. Rare. Wide umbilicus. Holotype illustrated.



Say's Top (1.5") 3.5 cm
Calliostoma sayanum Dall, 1889. No. Carolina to So. Florida. Offshore, 130 to 400 m. Uncommon. Holotype illustrated.



Oregon Atlantic Top (0.8") 2 cm
Calliostoma oregon Clench and Turner, 1960. Gulf of Mexico in 232 to 380 m. Uncommon. Holotype illustrated.



Marion's Top (1.2") 3 cm
Calliostoma marionae Dall, 1906. Off Florida to Mexico. Offshore from 46 to 180 m. Uncommon. Holotype illustrated.



Tejedor Top (1") 2.5 cm
Calliostoma tejedori Aguayo, 1949. Off north Cuba. Known only from this holotype. Nuclear whorls reticulated.



Schroeder's Top (1.3") 3 cm
Calliostoma schroederi Clench and Aguayo, 1938. Bahamas and Cuba, in 320 to 460 m. Paratype illustrated.



Chilean Top (1.5") 3.5 cm
Calliostoma chilena Rehder, 1971. Off Valparaiso, Chile, in 200 m. Rare. Holotype illustrated.



Formosa Top (2.4") 5.5 cm
Calliostoma formosense E. A. Smith, 1907. Japan to Taiwan. Deep water to 300 m. Common.



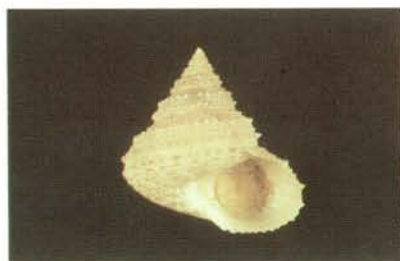
Nephelo Top (1") 2.5 cm
Calliostoma nepheloide Dall, 1913. West Mexico to Panama. Offshore from 146 to 256 m. Uncommon.



Sea Monarch Top (1.6") 4 cm
Calliostoma haliarchus (Melville, 1889). Japan. Sandy bottom, 50 to 200 m. Fairly common.



Dall's Unicum Top (0.9") 2.2 cm
Calliostoma unicum (Dunker, 1860). Japan, Korea, China. Intertidal gravels to 150 m. This is form *affinis* Dall (holotype illus.). Uncommon.



Soyo's Top (0.5") 1.2 cm
Calliostoma soyoae Ikebe, 1942. So. Japan; sandy bottom, 10-80 m; uncommon.



Panama Spiny Margarite (1.3") 3 cm
Turcica panamensis Olsson, 1971. Gulf of Panama. Offshore, 55 to 84 m. Rare.



Prickly Japanese Top (0.9") 2.2 cm
Calliostoma aculeatum (Sowerby, 1912). So. Japan; sandy bottom, 20-200 m; common. Syn.: *spinigera* Yokoyama.



Tiger Maurea (2.4") 6 cm
Maurea tigris (Martyn, 1784). New Zealand. Subtidal among boulders. Uncommon. Syn.: *tigris* Gmelin.



Punctate Maurea (1.5") 4 cm
Maurea punctulata (Martyn, 1784). New Zealand. Intertidal to offshore among boulders. Uncommon.



Multibeaded Maurea (1.5") 4 cm
Maurea multigemmata (Powell, 1952). Southern New Zealand. Offshore; rare.



Black's Maurea (2.5") 6 cm
Maurea blacki (Powell, 1950). Southern New Zealand. Shallow water; uncommon.



Pellucid Maurea (2") 5 cm
Maurea pellucida (Valenciennes, 1846). Northern New Zealand. Subtidal, rocky bottom. Not uncommon. Has several forms.



Select Maurea (2") 5 cm
Maurea selecta (Dillwyn, 1817). Northern and Central New Zealand. Sandy ocean beaches. Moderately common.



Superb Gaza (1.2") 3 cm
Gaza superba (Dall, 1881). Northern Gulf of Mexico and West Indies. Deep water, over 100 m. Locally common. Rare in collections.



Rathbun's Gaza (1.2") 3 cm
Gaza rathbuni Dall, 1890. Galapagos Islands. 717 to 915 m. Rare. Holotype illustrated.



Fischer's Gaza (1") 2.5 cm
Gaza fischeri Dall, 1889. Off Cuba and the Lesser Antilles. Deep water to 846 m. Rare. Holotype illustrated.



Banded Bankivia (0.6") 1.5 cm
Bankivia fasciata (Menke, 1830). Western to S. E. Australia; Tasmania. Abundant on weeds in shallow waters. Smooth; variable colors.



Whitish Gibbula (0.8") 2 cm
Gibbula albida (Gmelin, 1791). Mediterranean. Subtidal among rocks; common. Base with 6 to 8 threads. Syn.: *bornii* Cantraine.



Turbinate Monodont (1.2") 3 cm
Monodonta turbinata (Born, 1778). Portugal and Mediterranean. Intertidal among rocks; common. Syn.: *tessellata* Born, not Gmelin.



Lined Monodont (1") 2.5 cm
Monodonta lineata (da Costa, 1778). Gt. Britain to Portugal. Intertidal among rocks; common. Syn.: *crassa* Montagu.



Punctate Monodont (0.8") 2 cm
Monodonta punctulata (Lamarck, 1822). West Africa. Intertidal among rocks and weeds; common. No umbilicus. Syn.: *osilin* Deshayes.



Dama Monodont (0.8") 2 cm
Monodonta dama (Philippi, 1848). Red Sea; Arabia. Subtidal on rocks; common. Curved groove on lower inner lip.



Obtuse Monodont (1.2") 3 cm
Austrocochlea obtusa (Dillwyn, 1817). Northern half of Australia. Intertidal rocks; common.



Constricted Monodont (1.2") 3 cm
Austrocochlea constricta (Lamarck, 1822). South Australia; Tasmania. Intertidal rocks; common. 5 or 6 spiral ribs.



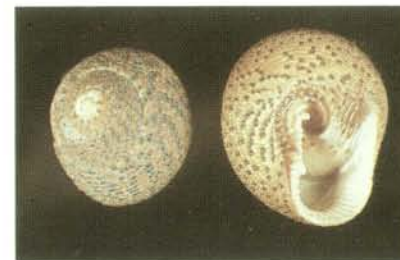
Green-mouth Monodont (1") 2.5 cm
Thalotia chlorostoma (Menke, 1843). South and Western Australia. Subtidal to 39 m; common. Some forms have rounded whorls.



Striate Jujubine (0.5") 1.2 cm
Jujubinus striatus (L., 1758). Azores to Mediterranean. Intertidal among rocks; common.



Black Monodont (1") 2.5 cm
Diloma nigerrima (Gmelin, 1791). New Zealand, cold water. Intertidal on black rocks; common. Syn.: *digna* Finlay.



Wavy Australian Monodont * (1") 2.5 cm
Clanculus undatus (Lamarck, 1816). Southern Australia; Tasmania. Intertidal algae and rocks; common.



Speckled Monodont (1") 2.5 cm
Diloma concamerata (Wood, 1828). Southern Australia; Tasmania. Abundant on intertidal reefs. Syn.: *striolatus* Q. & G.



Scorched Monodont (1") 2.5 cm
Melagraphia aethiops (Gmelin, 1791). New Zealand. Intertidal rocks; abundant.



Smooth Atlantic Tegula (0.7") 1.8 cm
Tegula fasciata (Born, 1778). South Florida to Brazil. Subtidal under rocks; common. Umbilicate. Syn.: *maculostriata* C. B. Adams.



Silver-mouthed Monodont (2.5") 6 cm
Chlorostoma argyrostomum (Gmelin, 1791). Japan. Intertidal among rocks; abundant. Green callus over base.



Green-based Tegula (0.5") 1.2 cm
Tegula excavata (Lamarck, 1822). Florida Keys and West Indies. Subtidal under rocks; abundant locally.



California Black Tegula (1.2") 3 cm
Tegula funebris (A. Adams, 1855). West Canada to Baja California. Intertidal on rocks; common.



Gilded Tegula (1") 2.5 cm
Tegula aureotincta Forbes, 1850. Southern California to W. Mexico. Intertidal on rocks; moderately common.



Serpent-tongue Tegula (1.6") 4 cm
Tegula pellisserpentis (Wood, 1828). El Salvador to W. Colombia. Intertidal on boulders; moderately common.



Rugose Monodont (1.5") 3.5 cm
Chlorostoma rugosum (A. Adams, 1853). Throughout Gulf of California. On rocks, upper intertidal zone; common.



Umbilical Gibbula (0.6") 1.5 cm
Gibbula umbilicalis (da Costa, 1778). N. W. Europe and Mediterranean. Intertidal on rocks; moderately common.



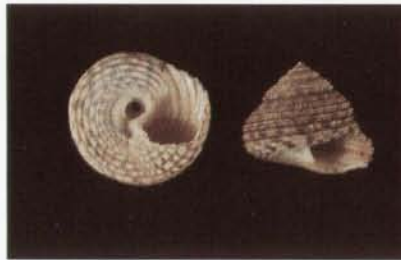
Sloping Gibbula (1") 2.4 cm
Gibbula declivis (Forsk., 1775). Red Sea and Arabia. Subtidal under rocks, common. Syn.: *aegyptiaca* Lamarck.



Divaricate Gibbula (1") 2.4 cm
Gibbula divaricata (L., 1758). Mediterranean and Adriatic. Intertidal rocks, moderately common. Shell thick.



Kotschy's Gibbula (1.2") 3 cm
Gibbula kotschy (Philippi, 1847). N. W. Indian Ocean. Subtidal to 2 m among small boulders; uncommon.



Beauty Gibbula (0.8") 2 cm
Monilea callifera (Lamarck, 1822). Indo-Pacific. Intertidal, under rocks; common. Syn.: *callosus* Wood.



Norris Shell (1.5") 4 cm
Norrisia norrisi (Sowerby, 1838). Central California to W. Mexico. Among kelp weed beds; moderately common.



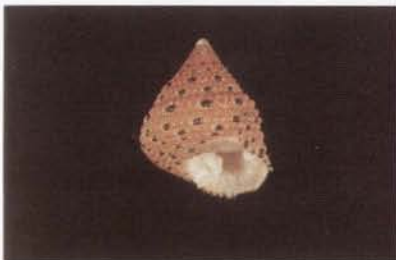
Purplish Clanculus • (0.7") 1.8 cm
Clanculus puniceus (Philippi, 1846). East Africa. Intertidal to 2 m, under rocks; locally common.



Mantle Clanculus • (0.8") 2 cm
Clanculus pharaonius (L., 1758). Indian Ocean. Intertidal under rocks; locally common.



Rare Clanculus (0.5") 1.2 cm
Clanculus rarus (Dufo, 1840). Indian Ocean. Subtidal, under rocks; uncommon. Syn.: *flosculus* Fischer.



Beautiful Clanculus (0.6") 1.5 cm
Clanculus margaritarius (Philippi, 1847). Indo-Pacific. Subtidal, under rocks; uncommon.



Secret Clanculus (0.6") 1.5 cm
Clanculus clanguloides (Wood, 1828). S. W. Pacific and northern Australia. Subtidal among weeds and rocks; moderately common.



Rosy-base Top (1.5") 4 cm
Oxystele sinensis (Gmelin, 1791). South Africa. Intertidal pools along rocky shores; common. Syn.: *merula* Lamarck.



Guam Button Top (0.5") 1.2 cm
Umbonium guamensis (Quoy & Gaimard, 1834). S. W. Pacific. Subtidal to 2 m in sand; moderately common. Syn.: *montrouzieri* Souverbie.



Common Button Top (0.4") 1 cm
Umbonium vestiarum (L., 1758). Indo-West Pacific. Sandy mud bottoms, subtidal to 4 m; locally abundant.



Zealandic Button Top (0.6") 1.5 cm
Umbonium zelandicum A. Adams, 1854. New Zealand. Subtidal to 6 m on sandy mud; common. Syn.: *anguliferus* Philippi.



Giant Button Top (1") 2.5 cm
Umbonium giganteum (Lesson, 1831). Japan. Fine sand bottom, 5 to 30 m; common.



Red Stomatella (0.6") 1.5 cm
Stomatolina rubra (Lamarck, 1822). Japan to S. W. Pacific. Gravel bottoms, subtidal to 20 m; common. Syn.: *angulata* A. Adams. In family Stomatellidae.



Papery Stomatella (1.2") 3 cm
Pseudostomatella papyracea (Gmelin, 1791). S. W. Pacific. Subtidal to 6 m on gravel bottoms; moderately common. In family Stomatellidae.



Colored Stomatella (0.8") 2 cm
Pseudostomatella decolorata (Gould, 1848). Central Pacific to Philippines. Sand and rock bottoms, 1 to 10 m; uncommon.



Elegant Stomatella (1") 2.5 cm
Pseudostomatella elegans (Gray, 1847). S. W. Pacific. Subtidal among boulders and weeds; uncommon.



Variable Stomatella (0.4") 1 cm
Stomatella (Gena) varia (A. Adams, 1850). Japan to S. W. Pacific. Subtidal to 20 m; common. Syn.: *dilecta* Gould; *lutea* A. Adams. *Gena* is a subgenus.



Flattened Stomatella (0.6") 1.5 cm
Stomatella (Gena) planulata Lamarck, 1816. Southwest Pacific. Intertidal to 10 m. among rocks; common.



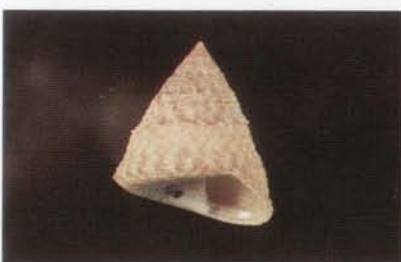
Strigose Stomatella (1") 2.5 cm
Stomatella (Gena) impertusa (Burrows, 1815). S. W. Pacific; Australia. Subtidal on gravel; uncommon. Syn.: *strigosa* A. Adams.



Swollen Stomatella (1.5") 3 cm
Stomatia phymotis Helbling, 1779. Japan to S. W. Pacific. Subtidal on rocky bottoms; moderately common. Syn.: *australis* A. Adams.



Radiate Top (1.5") 4 cm
Trochus radiatus (Gmelin, 1791). Indo-Pacific. Subtidal on coral reefs; common. Syn.: *fultoni* Melvill (from Pakistan).



Actor Top (1.2") 3 cm
Trochus histrio Reeve, 1848. Central Pacific to S. E. Asia. Subtidal on rocks; common. Syn.: *calcaratus* Souverbie.



Yellow-mouth Top (1.5") 3.5 cm
Trochus ochroleucus Gmelin, 1791. Indian Ocean. Subtidal on reefs; common.



Commercial Trochus (5") 13 cm
Trochus niloticus L., 1767. Indo-Pacific. Reefs to 20 m; abundant. Syn.: *maximus* Philippi. Used for making buttons.



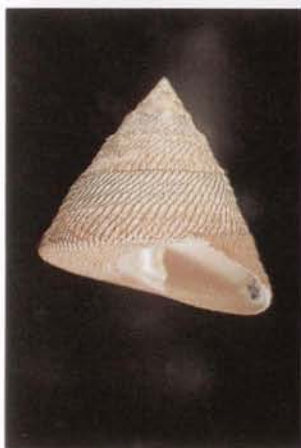
Cone-shaped Top (3") 7 cm
Trochus conus (Gmelin, 1791). Indo-Pacific. Near reefs to 5 m; common. Base rounded.



Striped Top (2.5") 6 cm
Trochus virgatus Gmelin, 1791. Indo-Pacific. Reef flats; moderately common.



Fenestrate Top (1.5") 4 cm
Tectus fenestratus (Gmelin, 1791). Central and S. W. Pacific. Reef flats, intertidal; moderately common.



Lined Top (2.2") 6 cm
Trochus hanleyanus Reeve, 1842. Warm reef waters of Australia; uncommon. Syn.: *lineatus* Lamarck (not da Costa, 1778).



Maculated Top (2") 5 cm
Trochus maculatus L., 1758. Indo-Pacific. Reef flats, shallow water; common. Variable. Syn.: *verrucosus* Gmelin; *granosus* Lamarck.



Pyramid Top (3") 7 cm
Tectus pyramis (Born, 1778). Indo-Pacific. Shallow reefs; locally abundant. Syn.: *obeliscus* Gmelin; *acutus* Lamarck.



Noded Pyramid Top (3") 7 cm
Tectus pyramis form *noduliferus* Lamarck, 1822. S. W. Pacific and Indian Ocean; uncommon.



Red Sea Top (2") 5 cm
Trochus erythraeus Brocchi, 1821. Red Sea; N. W. Indian Ocean. Subtidal to 3 m, on rocks and weeds; common locally.



Green Jewel Top (1.5") 4 cm
Phasianotrochus eximius (Perry, 1811). South coasts of Australia. Subtidal to 3 m, among weeds; common.

TURBAN SHELLS FAMILY TURBINIDAE

This is a large family of top-shaped snails, usually with thick shells, an iridescent interior, and usually with a shelly operculum that seals the aperture. Several hundred species are known, most from tropical seas. *Angaria* belongs to the Trochidae. Most species are vegetarians, feeding on marine algae.



Jourdan's Turban (8") 21 cm
Turbo jourdani Kiener, 1839. Southern Australia. Just off-shore along rocky coast; not uncommon. Syn.: *verconis* Iredale.



Magnificent Turban (3") 7 cm
Turbo magnificus Jonas, 1844. South Ecuador to Chile. Offshore to 25 m; uncommon.



Tapestry Turban (2.5") 6 cm
Turbo petholatus L., 1758. Central and Western Pacific. Shallow reefs; common. Operculum green, called "cat's eye."



Reeve's Turban (2.5") 6 cm
Turbo reevei Philippi, 1847. Philippines; Indonesia. Shallow reefs; common. Operculum white to brown-stained.



Miniature Turban (1.5") 3.5 cm
Turbo parvulus Philippi, 1848. Western Pacific. Shallow water reefs; uncommon.



Great Green Turban (8") 20 cm
Turbo marmoratus L., 1758. Indo-Pacific, west of Fiji. Rubble bottom 4 to 20 m, locally abundant. Syn.: *regenfussii* Deshayes.



Horned Turban (3") 7 cm
Turbo cornutus Lightfoot, 1786. Japan; East China. Offshore on sand, 2 to 10 m; abundant. Used as food. Syn.: *cornutus* Gmelin.



Silver-mouth Turban (3") 7 cm
Turbo argyrostoma L., 1758. Indo-Pacific. Reefs, intertidal to 3 m.; common. Syn.: *carduus* Fischer.



Silver-mouth Turban (3") 7 cm
Turbo argyrostoma L., 1758. One of the long-spined variations of this common Indo-Pacific turban.



Lajonkaire's Turban (3") 7 cm
Turbo lajonkairii Deshayes, 1839. Indian Ocean, especially Cocos-Keeling Atoll. Extreme variation of *argyrostoma*.



Rough Turban (2.5") 6 cm
Turbo setosus Gmelin, 1791. Central and S. W. Pacific. Edge of outer reefs; abundant. Operculum finely granulate in the center.



Brown Pacific Turban (2") 5 cm
Turbo bruneus (Röding, 1798). Indo-Pacific. Shallow reefs; abundant. Syn.: *ticaonicus* Reeve.



Gold-mouth Turban (2.4") 6 cm
Turbo chrysostomus L., 1758. Indo-Pacific. Subtidal near reefs; common.



Corded Turban (3") 7.5 cm
Turbo sparverius Gmelin, 1791. S. W. Pacific. Near reefs in 1 to 5 m; uncommon. Operculum purple-brown in center.



Crass Turban (3") 8 cm
Turbo crassus Wood, 1829. Central to S. W. Pacific. Near reefs in 1 to 5 m; common. Operculum pustulose, brown in center.



Beautiful Turban (3") 8 cm
Turbo intercostalis Menke, 1843. West and S. W. Australia. Subtidal, shallow reefs; common. Operculum with coarse pustules. Syn.: *pulcher* Reeve (not Dillwyn).



Gruner's Turban (1.5") 3.5 cm
Turbo gruneri Philippi, 1846. Southern Australia; Tasmania. Offshore to 160 m; common. Syn.: *circularis* Reeve.



Channeled Turban (3") 7 cm
Turbo canaliculatus Hermann, 1781. S. E. Florida to Brazil. Offshore near reefs to 10 m; uncommon. Operculum smooth, white.



Chestnut Turban (1.5") 3.5 cm
Turbo castanea Gmelin, 1791. S. E. United States to Brazil. Subtidal to 30 m on sand; common. Rarely red, white, lavender.



Filose Turban (0.7") 1.8 cm
Turbo caillietii Fischer and Bernardi, 1856. S. E. Florida and Caribbean. Near coral reefs, 4 to 40 m; rare. Syn.: *filosus* Kiener. Rarely yellow.



South African Turban (3") 7 cm
Turbo sarmaticus L., 1758. South Africa. Subtidal on rocky shores; abundant. Polished specimen.



South African Turban (3") 7 cm
Turbo sarmaticus L., 1758. Specimen in natural condition with periostracal covering. Operculum crudely pustulose.



Natal Turban (1.5") 4 cm
Turbo natalensis Krauss, 1848. South Africa. Subtidal to 4 m on rocks; moderately common.



Crown Turban (2.4") 6 cm
Turbo cidaris Gmelin, 1791. False Bay to Port Alfred, South Africa. Shore rocks; common. Banded form.



Crown Turban (2.4") 6 cm
Turbo cidaris Gmelin, 1791. South Africa. Mottled form. Operculum granulate, with a central pit.



Stony Turban (2") 4.5 cm
Turbo saxosus Wood, 1828. Nicaragua to Peru. Subtidal to 5 m among rocks; common. Syn.: *venustus* Philippi.



Wavy Turban (2.5") 6 cm
Turbo fluctuosus Wood, 1828. W. Mexico to Peru. Intertidal among rocks; common. Syn.: *fluctuatus* Reeve.



Smooth Moon Turban (1.2") 3.5 cm
Lunella cinerea (Born, 1778). Indo-Pacific. Intertidal among shore rocks; abundant. Syn.: *porphyrites* Gmelin; *picta* Röding.



Granulated Moon Turban (1.2") 3.5 cm
Lunella granulata (Gmelin, 1791). Indian Ocean. Intertidal on shore rocks to 3 m; locally common.



Coronate Moon Turban (1.2") 3.5 cm
Lunella coronata (Gmelin, 1791). Japan and Korea. Intertidal among rocks and gravel. Syn.: *corensis* Récluz.



Emerald Moon Turban (2.7") 7 cm
Lunella smaragdus (Gmelin, 1791). New Zealand. Intertidal rocky shores; common. Operculum green.



Lightning Moon Turban (2.4") 6 cm
Subnirrella undulata (Lightfoot, 1786). South Australia. On reefs, low-tide mark to 30 m; common.



Snare Turban (1") 2.5 cm
Homalopoma transenna (Watson, 1879). Off Japan, in 840 m; rare. Surface cut into little diamonds. Operculum whitish.



Péron's Liotia (0.6") 1.5 cm
Liotina peronii (Kiener, 1839). Indo-Pacific. Subtidal under dead coral; uncommon. Operculum with shelly granules. Syn.: *hermanni* Pilsbry.



Miss Cooke's Liotia (0.7") 1.8 cm
Macrarena cookeana (Dall, 1918). Baja California. Offshore, 10 to 183 m; on gravel bottom; uncommon. Syn.: *coronadensis* Stohler.



Californian Liotia (0.6") 1.5 cm
Macrarena californica (Dall, 1908). Off Cedros Is. to Gulf of California; uncommon. Holotype illus. Syn.: *pacis* Dall.



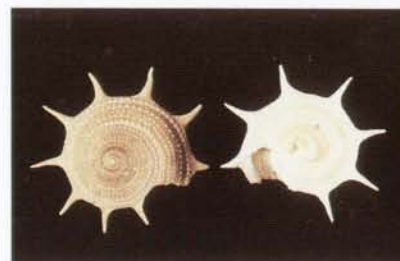
Captain Cook's Turban (3.5") 9 cm
Cookia sulcata (Gmelin, 1791). New Zealand. Intertidal among rocks; common. Shelly operculum with 2 ribs.



Yoka Star Turban (3") 7.5 cm
Guildfordia yoka Jousseume, 1888. Off Japan in 100 to 500 m; moderately common.



Triumphant Star Turban (2") 5 cm
Guildfordia triumphans (Philippi, 1841). Off Japan in 50 to 100 m; common. Syn.: *guildfordiae* Reeve.



Kurz's Star Turban (1.5") 3.5 cm
Guildfordia kurzi Petuch, 1980. Philippines. Deep water, 50 to 100 m. Probably a dwarf form of *triumphans*. Uncommon.



Aculeate Star Turban (1.6") 4 cm
Guildfordia aculeata Kosuge, 1979. Central Philippines. Deep water in about 200 m; uncommon.



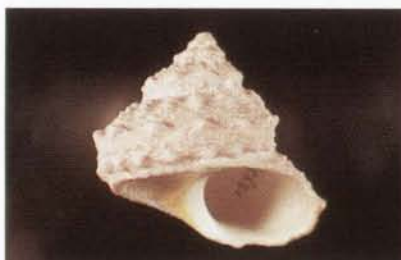
Sunburst Star Turban (3.5") 9 cm
Astraea heliotropium (Martyn, 1784). New Zealand. Offshore in deep water; uncommon. Syn.: *imperialis* Gmelin.



Sunburst Star Turban (3.5") 9 cm
Astraea heliotropium (Martyn, 1784). Underside view. Species discovered during Captain Cook's voyages to New Zealand.



Bartsch's Bolma (2") 5 cm
Bolma bartschi Dall, 1913. Off Moluccas, Indonesia. 410 m; rare. Holotype specimen illustrated.



Modest Bolma (2.2") 5.5 cm
Bolma modesta (Reeve, 1843). Japan; China; Taiwan. In gravel, 20 to 100 m; common. In subgenus *Harisazaea* Habe.



Jacqueline Bolma (1") 2.5 cm
Bolma jacquelineae (Marche-Marchad, 1957). Off Sierra Leone, West Africa; uncommon.



Bridled Bolma (3") 7 cm
Bolma aureola (Hedley, 1907). N. E. Australia. Offshore in 40 m; uncommon.



Sandpaper Bolma (1.5") 3.5 cm
Bolma guttata (A. Adams, 1863), subspecies *millegranosa* (Kuroda & Habe, 1958). Japan. Offshore in 20 to 50 m; uncommon. In subgenus *Galeoastrea* K. & H.



Abyssal Bolma (1.5") 3.5 cm
Pseudastridium abyssorum (Schepman, 1908). Indonesia. Deep water in 500 m; uncommon.



Peach Bolma (1") 2.5 cm
Pseudostratium persica (Dall, 1907). Off Kagashima, Japan. In deep water; rare. Holotype illustrated.



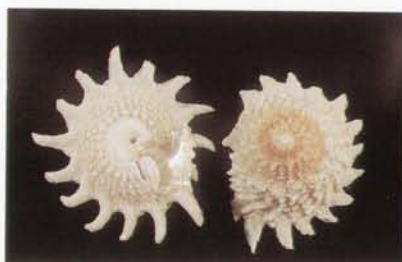
Little Star Bolma (0.5") 1.2 cm
Bolma asteriola (Dall, 1925). Sea of Japan. In deep water; rare. Holotype illustrated.



Busch's Star-shell (2") 5 cm
Astraea buschii (Philippi, 1844). Nicaragua to Peru. Intertidal rocky zone; common.



Half-ribbed Star-shell (1") 2.5 cm
Astraea semicostata (P. Fischer, 1875). Southeast Asia. Intertidal under rocks; locally common.



Long-spined Star-shell (2") 5 cm
Astraea phoebia Röding, 1798. Florida to Brazil; Bermuda. Shallow grassy flats; common. Syn.: *longispina* Lamarck.



Carved Star-shell (2.5") 6 cm
Astraea caelata (Gmelin, 1791). Florida and the West Indies. Subtidal on rocks to 10 m; common. Operculum finely pustulose.



Green Star-shell (2") 5 cm
Astraea tuber (L., 1767). Florida and the West Indies. Subtidal on rocks to 10 m; common. Operculum with curved ridge.



American Star-shell (1.5") 3.5 cm
Astraea tecta subspecies *americana* (Gmelin, 1791). Southeast Florida. Grassy flats and rocks; locally abundant.



Imbricate Star-shell (2") 5 cm
Astraea tecta (Lightfoot, 1786). Lesser Antilles. On rocks, 1 to 20 m; uncommon. Syn.: *imbricata* Gmelin. Rare in Florida.



Turban Star-shell • (6") 15 cm
Astraea turbanica (Dall, 1910). Baja California. Kelp beds; uncommon. Syn.: *petrothauma* Berry; *rupicollina* Stohler.



Red Western Turban (3") 7 cm
Astraea gibberosa (Dillwyn, 1817). Western Canada to Baja California. Subtidal rocks; common. Operculum white, smooth.



Wavy Turban (3") 7 cm
Astraea undosa (Wood, 1828). California to W. Mexico. Subtidal rocks; common. Operculum with 3 prickly ridges.



Blood-spotted Turban (2.5") 6 cm
Astraea olivacea (Wood, 1828). West Mexico. Subtidal on rocks; common. Umbilicus red.



Japanese Star-shell (3") 8 cm
Astraea japonica (Dunker, 1844). Japan and Korea. Subtidal to 20 m; common. In subgenus *Pomaulax* Gray.



Taylor's Star-shell ● (3") 7.5 cm
Bolma tayloriana (E. A. Smith, 1880). Japan. Deep water between 200 and 300 m; uncommon to rare. South Africa.



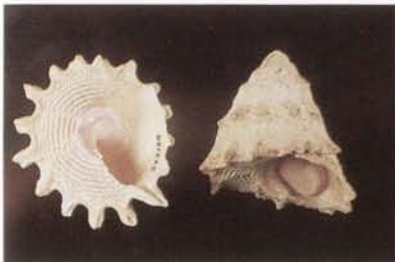
Girgyllus Star-shell (2") 5 cm
Bolma girgyllus (Reeve, 1861) Philippines; Taiwan. Deep water; rare.



Rotary Star-shell (1.5") 4 cm
Astraea rotularia (Lamarck, 1822). West and N. W. Australia. Subtidal rocks; common. Operculum brownish green.



Kesteven's Star-shell (1") 2.5 cm
Astraea kesteveni (Iredale, 1924). S. E. Australia. Subtidal on rocks; common. Syn.: *fimbriatus* Lamarck, not Borson.



Pacific Star-shell (1") 2.5 cm
Astraea haematraga (Menke, 1829). S. W. Pacific to Japan. Intertidal rocks to 20 m; common.



Common Delphinula (3") 7 cm
Angaria delphinus (L., 1758). Indo-Pacific. Sublittoral rocks; abundant. Has many forms. This genus belongs in Trochidae.



Imperial Delphinula (3") 7 cm
Angaria delphinus form *melanacantha* (Reeve, 1842). Philippines. Offshore. Uncommon. Spines grow longer in quiet waters. Syn.: *imperialis* Reeve.



Tyria Delphinula (3") 7 cm
Angaria delphinus form *tyria* (Reeve, 1842). S. W. Pacific and Australia. Operculum is chitinous.



Kiener's Delphinula (2") 5 cm
Angaria sphaerula (Kiener, 1839). Philippines. Offshore in quiet waters; moderately common. Variable in spine growth.



Victor Dan's Delphinula (2") 5 cm
Angaria vicdani Kosuge, 1980. Southern Philippines. Offshore in deep water. Uncommon.

PHEASANT SHELLS
FAMILY PHASIANELLIDAE

The pheasant shells are very colorful externally, but the interiors are porcelaneous, not pearly as in the turban shells. The operculum is chalky white and glossy. *Phasianella* species from Australia are large. The genera *Hiloria*, *Tricolia* and *Gabrielona* are less than a quarter-inch in size.



Variegated Pheasant (0.6") 1.5 cm
Phasianella variegata Lamarck, 1822. Western Pacific and Indian Ocean. Subtidal among seaweeds; locally common. Many synonyms.



Australian Pheasant (2") 5 cm
Phasianella australis (Gmelin, 1791). Southern Australia and Tasmania; common. Color extremely variable. Operculum white.



Tessellate Pheasant (0.2") 5 mm
Tricolia tessellata (Potiez & Michaud, 1838). Southern half of Caribbean. Shallow water grass beds; common.



Mediterranean Pheasant (0.4") 1 cm
Tricolia speciosa (Mühlfeld, 1824). Adriatic and Mediterranean Seas. Subtidal; on weeds; common.



Swollen Pheasant (1.5") 4 cm
Phasianella ventricosa Swainson, 1822. Southern Australia and Tasmania; common. Variable in color. Syn.: *zebra* Reeve; *perdix* Wood.

THE NERITES
FAMILY NERITIDAE

The nerites are mainly shore dwellers and live either on rocks or mangrove trees. A few, like *Septaria*, live in freshwater. The shelly operculum has a short projection. There are about 50 species, mostly found in the tropics. The related family Neritopsidae has only one living genus, *Neritopsis*.



Radula Nerite (1") 1.5 cm
Neritopsis radula (L., 1758). Indo-Pacific. Shallow water near reefs; uncommon. Columella has square U-shaped notch. Operculum white, very thick.



Bleeding Tooth (1.2") 3 cm
Nerita peloronta (L., 1758). South Florida, West Indies and Bermuda. Shore rocks; abundant. Operculum dark red.



Tessellate Nerite (0.7") 1.8 cm
Nerita tessellata Gmelin, 1791. Florida to Brazil; Bermuda. Shore rocks; abundant. Operculum bluish or yellowish gray.



Four-toothed Nerite (0.7") 1.8 cm
Nerita versicolor Gmelin, 1791. South Florida and West Indies; Bermuda. Shore rocks; abundant. Operculum gray, pimpled.



Antillean Nerite (1") 2.5 cm
Nerita fulgurans Gmelin, 1791. Southeast U.S. to Brazil; Bermuda. Rocks and sand near freshwater seepage; uncommon.



Polished Nerite (1") 2.5 cm
Nerita polita L., 1758. Indo-Pacific. Intertidal on rocks near sand; abundant. Smooth. Variable colors.



Rumpf's Nerite (0.7") 1.8 cm
Nerita polita form *rumphii* Recluz, 1841. Spirally striate; smaller, frequently banded.



Ancient Nerite (1") 2.5 cm
Nerita polita subspecies *antiquata* Récluz, 1841. Northern half of Australia. Intertidal; common. Syn.: *australis* Wood, not Gmelin.



Maximum Nerite (1.3") 3 cm
Nerita maxima Gmelin, 1791. Central Pacific; uncommon. Teeth squarish, yellow. Surface finely incised.



Waved Nerite (0.7") 1.8 cm
Nerita undata L., 1758. Indo-Pacific. Intertidal rocks; abundant. Variable in color. Syn.: *striata* Burrow; *undulata* Gmelin.



Black African Nerite * (0.7") 1.8 cm
Nerita senegalensis Gmelin, 1791. Western Africa. Intertidal rocks abundant. Black Australian Nerite, *N. atramentosa* Reeve, 1855, of Australia—New Zealand is similar.



Lineate Nerite * (1") 2.5 cm
Nerita balteata Reeve, 1855. S. W. Pacific; Indian Ocean. Intertidal rocks; common. Syn.: *lineata* Gmelin, non Müller.



Chameleon Nerite (1") 2.5 cm
Nerita chamaeleon L., 1758. Indo-Pacific. Intertidal rocks; common. Operculum dark-green, pustulose.



Snake-skin Nerite (1") 2.5 cm
Nerita exuvia L., 1758. Southwest Pacific. Intertidal rocks; common. Near mangroves.



Costate Nerite (1.2") 3 cm
Nerita costata Gmelin, 1791. Indo-Pacific. Intertidal rocks; common.



Ascension Nerite (1.2") 3 cm
Nerita ascensionis Gmelin, 1791. Ascension Island; Eastern Brazil. Syn.: *deturpensis* and *trinidadensis* Vermeij.



Reticulate Nerite (0.7") 1.8 cm
Nerita signata Macleay in Lamarck, 1822. Indo-Pacific. Intertidal reefs; common. Syn.: *reticulata* Karsten (non-binomial).



Plicate Nerite (1") 2.5 cm
Nerita plicata L., 1758. Indo-Pacific. Intertidal rocks; abundant. Rarely speckled.



Ox-palate Nerite (1") 2.5 cm
Nerita albicilla L., 1758. Indo-Pacific. Intertidal inshore rocks; abundant. Syn.: *ustulata* Sowerby.



Flat-spined Nerite (1.2") 3 cm
Nerita planospira Anton, 1839. Indo-Pacific. Intertidal, near mangroves; locally common in Southwest Pacific.



Textile Nerite (1.5") 4 cm
Nerita textilis Gmelin, 1791. Indian Ocean. Higher shore rocks; locally common. Syn.: *plexa* Dillwyn.



Ornate Nerite (1.5") 4 cm
Nerita scabricosta Lamarck, 1822. W. Mexico to Ecuador. Intertidal rocks; common. Syn.: *ornata* Sowerby; *fuscata* Menke.



Funiculate Nerite (1") 2.5 cm
Nerita funiculata Menke, 1851. W. Mexico to Peru; Galapagos. Intertidal rocks; common. Syn.: *bernhardi* Récluz.



Zigzag Nerite (0.5") 1.2 cm
Neritina communis (Quoy & Gaimard, 1832). S. W. Pacific. Among mangroves; abundant. Syn.: *ziczac* of authors.



Turreted Nerite (0.7") 1.8 cm
Neritina turrata (Gmelin, 1791). S. W. Pacific. Intertidal, near mangroves; common.



Violet Nerite (1") 2.5 cm
Neritina violacea (Gmelin, 1791). S. W. Pacific. Intertidal, near mangroves; common.



Dusky Nerite (1.2") 3 cm
Neritina pulligera L., 1767. S. W. Pacific. Intertidal, near mangroves; common.



Olive Nerite (0.5") 1.2 cm
Neritina reclinata (Say, 1822). S. E. United States and West Indies. Intertidal, brackish mud flats; abundant. Syn.: *sphaera* Pilsbry.



Virgin Nerite (0.4") 1 cm
Neritina virginea (L., 1758). Florida to Brazil; Bermuda. Intertidal, brackish mud and grass flats; abundant.



Dotted Nerite (0.7") 1.8 cm
Neritina puncticulata Lamarck, 1822. West Indies. Rocky bottoms near rivers; locally common.



Dubious Nerite (1") 2.5 cm
Neritodryas dubia (Gmelin, 1791). S. W. Pacific. Intertidal, brackish; common.



Weakly cut Nerite (1") 2.5 cm
Neritodryas subsulcata (Sowerby, 1836). S. W. Pacific; Philippines. Intertidal in mangroves; common.



Horny Nerite (1") 2.5 cm
Neritodryas cornea (L., 1758). S. W. Pacific. Intertidal, on mangroves; abundant.



Painted Panama Nerite (0.5") 1.2 cm
Theodoxus luteofasciatus (Miller, 1879). Gulf of California to Peru. Mangrove mud flats; abundant. Syn.: *picta* Reeve (not Eichwald).



Guamanian Nerite (0.4") 1 cm
Theodoxus ovalaniensis (Lesson, 1831). Indo-Pacific. Intertidal grass flats; very common. Syn.: *guamensis* Lesson.



Coronate Nerite (0.4") 1 cm
Theodoxus coronatus (Leach, 1815). S. W. Pacific. On weeds, entrance to small rivers; abundant. Syn.: *longispina* Récluz.



Crown Nerite (0.4") 1 cm
Theodoxus corona (L., 1758). S. W. Pacific. On weeds in brackish ditches; abundant. Syn.: *brevispina* Lam.; *spinosa* Wood.



Zebra Nerite (0.7") 1.8 cm
Puperita pupa (L., 1758). S. E. Florida, West Indies and Bermuda. Rocky tide pools; abundant. Syn.: *tristis* Orbigny.



Dark Zebra Nerite (0.7") 1.8 cm
Puperita pupa form *tristis* (Orbigny, 1842.) Mostly in West Indies. Rocky pools. Common.



Emerald Nerite (0.3") 7 mm
Smaragdia viridis (L., 1758). S. E. Florida, West Indies, Bermuda. On eelgrass; common. Similar *S. rangiana* (Récluz, 1841) is from Indo-Pacific.



Pitchy Nerite (1") 2.5 cm
Nerita picea Récluz, 1841. S. W. Pacific (uncommon); Hawaii (common). Intertidal rocks.



Widest Nerite (1.2") 3 cm
Clypeolum latissimum (Broderip, 1833). W. Mexico to Ecuador. Mouths of small rivers; common. Syn.: *cassiculum* Sowerby.



Eared Nerite (1.2") 3 cm
Clypeolum auriculatum (Lamarck, 1816). S. W. Pacific; S. E. Asia. Freshwater; mouths of small rivers on rocks; common. Syn.: *subulata* Récluz.



Granose Nerite (1.2") 3 cm
Clypeolum granosum (Sowerby, 1825). Endemic to Hawaii. Freshwater; rocks at mouths of small rivers and upstream; common.



Bourbon Nerite (1") 2.5 cm
Septaria borbonica (Bory, 1803). S. W. Pacific (large islands); S. E. Asia. Freshwater; on smooth rocks in rivers; common. Operculum internal.



Janella Nerite (1") 2.5 cm
Septaria janelli (Récluz, 1841). S.W. Pacific; Indonesia. Freshwater, on stones in small rivers; uncommon.

ORDER CAENOGASTROPODA

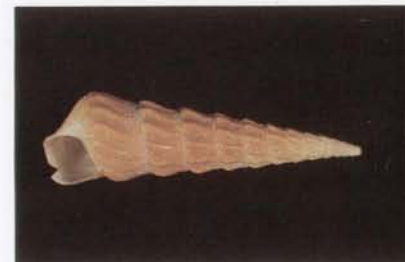
This is the largest division of the gastropods, differing from the previous primitive group in having lost, through evolution, the right gill, right auricle of the heart and right kidney. The radula is reduced to only seven or fewer rows of teeth. None produces pearly shells. The order contains such snails as the periwinkles, conchs, cowries and cones.

DEEPSEA AUGERS FAMILY ABYSOCHRYSIDAE

This is a rare, relict family of strange little shells seldom treated in popular books. The animal is blind and has its copulatory organ on the mantle edge. The operculum is soft and horny. The two known species of this family live on mud at very great depths in the ocean.



Melvill's Abyssal Snail (1.5") 3.6 cm
Abysochrysos melvilli (Schepman, 1909). S. W. Pacific and S. E. Africa. Deep water, 491 to 1,479 m; rare. Syn.: *tomlini* Barnard.



Melanioides Abyssal Snail (1.6") 4 cm
Abysochrysos melanioides Tomlin, 1927. Off South Africa, 1,456 to 2,712 m; rare.

THE PERIWINKLES FAMILY LITTORINIDAE

The true periwinkles are a well-known family living in the littoral region of most parts of the world. There are about 30 species, some living on rocky coasts, others preferring mangroves. The sexes are separate. Females either give birth to live young, shed eggs into the water, or lay jelly masses. The operculum has few whorls and is horny.



Peruvian Periwinkle (0.5") 1.2 cm
Littorina peruviana (Lamarck, 1822). Ecuador to Chile. Intertidal on rocks; common.



Common Periwinkle (1") 2.5 cm
Littorina littorea (L., 1758). Western Europe; N. E. North America. Intertidal on rocks; abundant. Used as food.



Marsh Periwinkle (1") 2.5 cm
Littorina irrorata (Say, 1822).
New York to central Florida to
Texas. Shell heavy. On marsh
sedges; abundant.



Ziczac Periwinkle (0.7") 1.8 cm
Littorina ziczac (Gmelin, 1791).
S. E. Florida; West Indies; Ber-
muda. Intertidal rocks; abun-
dant.



Angulate Periwinkle (1") 2.5 cm
Littorina scabra angulifera (La-
marck, 1822). S. E. United
States to Brazil; Bermuda.
Mangrove areas; common.



Scabra Periwinkle (1") 2.5 cm
Littorina scabra scabra (L.,
1758). Indo-Pacific. Among
mangroves; abundant.



Cloudy Periwinkle (0.7") 1.8 cm
Littorina nebulosa (Lamarck,
1822). S. E. United States to Bra-
zil. Intertidal; common. Colu-
mella mauve.



Undulate Periwinkle
(0.7") 1.8 cm
Littorina undulata Gray, 1839.
Indo-Pacific. Intertidal rocks;
abundant.



Banded Periwinkle (1.2") 3 cm
Littorina fasciata Gray, 1839. W.
Mexico to Ecuador. Intertidal
rocks; common.



Eroded Periwinkle (0.7") 1.8 cm
Littorina keenae Rosewater,
1978. Pacific Canada to W. Mex-
ico. Intertidal rocks; abundant.
Syn.: *planaxis* Philippi.



Zebra Periwinkle (1.3") 3.2 cm
Littorina zebra Donovan, 1825.
Costa Rica to W. Colombia. In-
tertidal rocks; common. Syn.:
pulchra Sowerby.



Modest Periwinkle (0.6") 1.5 cm
Littorina modesta Philippi,
1846. W. Mexico to Ecuador. In-
tertidal rocks; common. Syn.:
conspersa Philippi.



Scarlet Periwinkle (1") 2.5 cm
Littorina coccinea (Gmelin,
1791). Central and S. W. Pacific.
Intertidal rocks; abundant.
Syn.: *obesa* Sowerby.



Dotted Periwinkle (0.7") 1.8 cm
Littorina pintado (Wood, 1828).
Indo-Pacific. Intertidal rocks;
abundant.



Common Prickly-winkle (0.5")
1.2 cm *Nodilittorina tuberculata*
(Menke, 1828). Southern Florida;
Bermuda. Intertidal rocks;
common. Syn.: *trochiformis*
Dillwyn.



Beaded Periwinkle (1") 2.4 cm
Tectarius muricatus (L., 1758).
Southern Florida, West Indies,
Bermuda. Upper intertidal
rocks; abundant.



Pagoda Prickly-winkle (2") 5 cm
Tectarius pagodus (L., 1758). S.
W. Pacific. High intertidal
rocks; common. Syn.: *major*
Swainson.



Coronate Prickly-winkle (1.5")
4 cm *Tectarius coronatus* Valenciennes, 1832. Philippines and Celebes. Intertidal rocks; locally common. Syn.: *rugosus* Wood.



Papillate Prickly-winkle (1.2")
3 cm *Tectarius tectumpersicum*
(L., 1758). S. W. Pacific. Intertidal rocks; common. Syn.: *papillosus* Lamarck.



Hailstorm Prickly-winkle (1.5")
4 cm *Tectarius grandinatus*
(Gmelin, 1791). S. E. Polynesia. Intertidal rocks; common. Syn.: *bullatus* Martyn.



Rustic Prickly-winkle (1.5") 4 cm
Tectarius rusticus (Philippi, 1846). N. W. Australia. Rocks at high-tide line; uncommon.

RISSE SNAILS and VITRINELLIDAE

SUPERFAMILY RISSOACEA

This large group of several families of tiny snails includes the Caecidae, Rissoinidae, and Vitrinellidae. Most species are less than 5 mm and require a hand lens or microscope for proper identification. Many are freshwater, a few parasitic. Operculum is always horny.



Spiral Risso (0.6") 1.5 cm
Rissoina spirata (Sowerby, 1824). Central Pacific. Shallow water in sand; uncommon.



California Caecum (0.2") 5 mm
Caecum californicum Dall, 1885. California to W. Mexico. Sand, shallow water; common. 30-40 rings.



Beau's Vitrinella (0.3") 7 mm
Cyclostremiscus beaui (Fischer, 1857). S. E. United States to Brazil. Sand, shallow water; uncommon. 6 spiral threads on top.

TURRITELLAS FAMILY TURRITELLIDAE

A worldwide, abundant group of sandy mud snails found offshore. Operculum chitinous, many whorls, sometimes with bristles on the edge. Several hundred species known, mostly tropical. No siphonal canal. Also see the Augers, Terebridae.



Mesal Turritella (2") 5 cm
Mesalia brevis (Lamarck, 1822). W. and N. Africa. Shallow water, in sand; common. Syn.: *mesal* Deshayes.



Opal Turritella (1") 2.5 cm
Mesalia opalina (Adams & Reeve, 1850). West Africa. Offshore in sand; uncommon. Minutely striate.



Variagate Turritella (3") 8 cm
Turritella variegata (L., 1758). West Indies. Subtidal, sandy mud bays; locally common.



Eastern American Turritella (2") 5 cm
Turritella exoleta (L., 1758). S. E. United States to Brazil. Offshore, 1 to 99 m, sand; common. Rarely purplish.



Common European Turritella (2") 5 cm
Turritella communis Risso, 1826. Western Europe. In sand, 6 to 200 m; common. Syn.: *linnaei* Deshayes.



Three-ridged Turritella (2") 5 cm
Archimediella triplicata (Brocchi, 1814). Mediterranean; Canary Is.; W. Africa. Offshore, 18 to 36 m; common.



Screw Turritella (6") 16 cm
Turritella terebra (L., 1758). S. W. Pacific. Subtidal, sandy mud; abundant.



Pointed Turritella (2") 5 cm
Turritella fastigiata Adams & Reeve, 1850. East Indies. Subtidal mud flats; common.



Strong-ribbed Turritella (1") 2.5 cm
Turritella fortirata Sowerby, 1914. Japan, cool water. Offshore, sand; moderately common.



Rosy Turritella (2.3") 6 cm
Maoricolpus rosea (Quoy & Gaimard, 1834). New Zealand. Intertidal, mud; common. Syn.: *manukauensis* Powell.



Striped Turritella (1.5") 4 cm
Zeacolpus vittatus (Hutton, 1873). New Zealand. Offshore, sand; uncommon.



Banded Turritella (3") 7 cm
Turritella cingulata Sowerby, 1825. Chile. Subtidal; common. Syn.: *tricarinata* King.



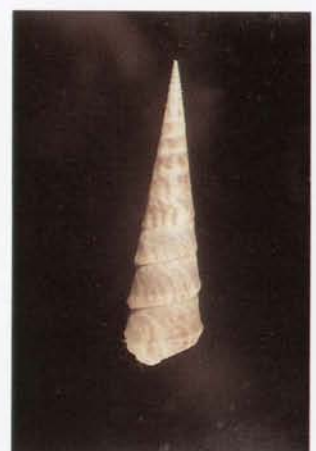
Angle-mouth Turretella (4")
10 cm *Turretella gonostoma* Valenciennes, 1832. W. Mexico to Ecuador. Subtidal; common. Syn.: "*goniostoma*."



White-mouthed Turretella (4")
10 cm *Turretella leucostoma* Valenciennes, 1832. Baja California to Panama. 1 to 40 m, mud; common. Syn.: *tigrina* Kiener.



Duplicate Turretella (5") 12 cm
Turretella duplicata (L., 1758). S. E. Asia; Indian Ocean. Subtidal, sand; common. Syn.: *acutangula* L.



Master Turretella (5") 12 cm
Turretella anactor Berry, 1957. W. Mexico. Offshore; uncommon. Paratype specimen illustrated.



Ligar Turretella (4") 10 cm
Turretella ligar Deshayes, 1843. W. Africa. Offshore to 20 m; uncommon. Syn.: *flammulata* Kiener.



Carinate Turretella (3") 7 cm
Turretella carinifera Lamarck, 1822. South Africa. Offshore to 240 m; common.



Bloody Turretella (4") 10 cm
Turretella sanguinea Reeve, 1849. South Africa. Offshore to 110 m; common.



Sloping Turretella (3.5") 9 cm
Turretella declivis Adams & Reeve, 1850. South Africa. Offshore to 178 meters; uncommon. Syn.: *excavata* Sowerby.



Gunn's Turretella (2") 5 cm
Turretella gunnii Reeve, 1849. Tasmania; South Australia. Subtidal; uncommon.



Kowie Turretella (2") 5 cm
Turretella kowiensis Sowerby, 1900. South Africa. Subtidal to 51 m; uncommon.



Knocker's Turretella (2.5") 6 cm
Protoma knockeri Baird, 1870. West Africa. Intertidal to offshore; moderately common.



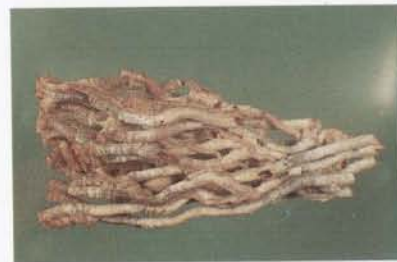
Projecting Turretella (3") 7.5 cm
Turretella torulosa Kiener, 1843. West Africa. Shallow water, sandy mud; common.



West Indian Worm-shell (4") 10 cm
Vermicularia spirata (Philippi, 1836). S. E. Florida; West Indies; Bermuda. In sponges, shallow water. Family Turritellidae.

WORM-SHELLS FAMILY VERMETIDAE

Long, slender, usually coiling shells resembling "worm tubes" and growing in clumps or attached singly to rocks and shells. Operculum, when present, many-whorled and horny. Contains *Vermetus*, *Dendropoma* (*Spiroglyphus*) and *Serpuloides*.



Variable Worm-shell (6") 15 cm
Petalconchus varians (Orbigny, 1841). Florida to Brazil; Bermuda. Forms reefs in shallow water. Types of *nigricans* Dall illustrated.



Irregular Worm-shell (2") 5 cm
Dendropoma irregularis (Orbigny, 1842). S. E. Florida to Brazil. Bermuda. Attached to rocks; common.



Slit Worm-shell (1.5") 4 cm
Siliquaria squamata Blainville, 1827. S. E. United States to Brazil; Bermuda; common. In family Siliquariidae.



Ponderous Worm-shell (8") 19 cm
Siliquaria ponderosa (Mörch, 1860). S. W. Pacific. Shallow water; uncommon.

SUNDIALS FAMILY ARCHITECTONICIDAE

The sundial shells are flat and with a large umbilicus. The operculum is horny, sometimes button-shaped. Most species are tropical in shallow to deep water. A few, like *Pseudomalaxis*, are microscopic.



Giant Sundial (2.5") 6 cm
Architectonica maxima (Philippi, 1849). Indo-Pacific. Sandy bottom, 10 to 50 m; common.



Giant Sundial (2.5") 6 cm
Architectonica maxima (Philippi, 1849). Underside view. The wide, deep umbilicus accommodates the beehive-shaped operculum.



American Sundial • (2") 5 cm
Architectonica nobilis Röding, 1798. S. E. United States to Brazil; W. Mexico to Peru. Shallow water; locally common. Syn.: *granulata* Lamarck.



Clear Sundial (2") 5 cm
Architectonica perspectiva (L., 1758). Indo-Pacific. Shallow water, sand; common to abundant.



Smooth Sundial (1.5") 4 cm
Architectonica laevigata (Lamarck, 1816). Indian Ocean. Shallow water, sand; uncommon.



Sharp-edged Sundial (1.2") 3 cm
Acutitectonica acutissima (Sowerby, 1914). Japan to northern Australia in 50 to 200 m; uncommon.



Straw Sundial (1.4") 3.5 cm
Heliacus stramineus (Gmelin, 1791). Indo-Pacific. Shallow water; uncommon.



Noble Sundial (0.3") 7 mm
Pseudomalaxis nobilis Verrill, 1885. S. E. United States; West Indies. Deep water to 140 m; rare.

PLANAXIS SNAILS FAMILY PLANAXIDAE

Resembling *Littorina* periwinkles. Shell very thick, often spirally grooved. Siphonal notch present. Operculum corneous. Some species bear living young in the oviduct. All are tropical and live near shore.



Sulcate Planaxis (0.7") 1.8 cm
Planaxis sulcatus (Born, 1778). Indo-Pacific. Subtidal among rocks; abundant.



Black Atlantic Planaxis (0.5") 1.2 cm
Planaxis nucleus (Bruguière, 1789). S. E. Florida; West Indies; Bermuda. Littoral on rocks; abundant.



Dwarf Atlantic Planaxis (0.3") 7 mm
Planaxis lineatus (da Costa, 1778). S. E. Florida to Brazil. Littoral, coral gravel; abundant.



Dwarf Pacific Planaxis (0.3") 7 mm
Planaxis labiosa A. Adams, 1853. Central and S. W. Pacific. Midtidal line among coral gravel; abundant. Syn.: *fasciatus* Pease.



Hinea Planaxis (0.7") 1.8 cm
Hinea brasiliana (Lamarck, 1822). S. W. Pacific; New Zealand. Intertidal, rocks; locally common. Syn.: *mollis* Sowerby.



Black-brown Planaxis (0.6") 1.5 cm
Planaxis nigra Quoy & Gaimard, 1834. Indo-Pacific. Intertidal rocks; common. Syn.: *hanleyi* E. A. Smith; *abbreviatus* Pease.



Decollate Planaxis (1.2") 3 cm
Quoyia decollata Quoy & Gaimard, 1834. S. W. Pacific. Intertidal rocks; locally common. Syn.: *michaudi* Crosse & Fischer.

MODULUS SHELLS FAMILY MODULIDAE

Small, tropical snails living in shallow water. The top-shaped shell has a small tooth at the base of the columella. Operculum corneous, many-whorled. About 8 species known.



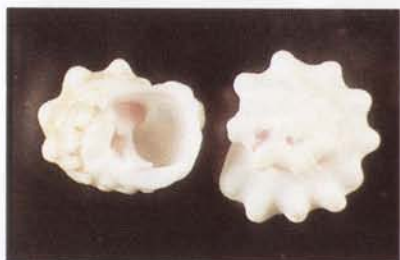
Atlantic Modulus (0.5") 1.2 cm
Modulus modulus (L., 1758). S. E. United States to Brazil; Bermuda. Shallow water among sea grass; abundant.



Angled Modulus (0.5") 1.2 cm
Modulus carchedonius (Lamarck, 1822). Caribbean. Shallow water; uncommon. Syn.: *angulata* C. B. Adams.



Little Chain Modulus (0.5") 1.2 cm
Modulus catenulatus (Philippi, 1849). Gulf of California to Ecuador. Intertidal grassy flats; common.



Waxy Modulus (0.6") 1.5 cm
Modulus cerodes (A. Adams, 1851). Gulf of California to Panama. Mud flats; common.



Tectum Modulus (1.2") 3 cm
Modulus tectum (Gmelin, 1791). Indo-Pacific. Among weeds in shallow water; locally common.



Glowing Modulus (0.7") 1.8 cm
Modulus candidus Petit, 1853. Central and S. W. Pacific. Shallow water; uncommon. No black line on columella.



Little Disk Modulus (0.6") 1.5 cm
Modulus disculus (Philippi, 1846). Gulf of California to Panama. Intertidal grassy mud flats; common.

HORN SNAILS FAMILY POTAMIDIDAE

Slender, dull-colored shells usually living in tropical muddy or brackish water areas. Occur in large colonies. Operculum horny, thin, circular and many-whorled.



False Caribbean Cerith (0.3") 5 mm
Batillaria minima (Gmelin, 1791). Southern Florida to Brazil; Bermuda. Mud flats; abundant. Variable striping.



Zoned Cerith (1.2") 3 cm
Batillaria zonalis (Bruguère, 1792). Japan; S. W. Pacific. Mud flats; abundant. Introduced to western United States.



Many-formed Cerith (1") 2.5 cm
Batillaria multiformis (Lischke, 1869). Japan. Intertidal, gravel and mud bottoms; abundant.



Rhino Cerith (1.4") 3.5 cm
Rhinocoryne humboldti (Valenciennes, 1832). W. Mexico to Chile. Estuaries to 27 m; abundant. Syn.: *pacificum* Sowerby.



Ebony Swamp Cerith (4") 10 cm
Pyrazus ebeninus (Bruguière, 1792). Eastern Australia. Mud flats, intertidal. Locally abundant.



Sulcate Swamp Cerith (2") 5 cm
Terebralia sulcata (Bruguière, 1792). Indo-West Pacific. Intertidal, estuary mud flats; abundant.



Mud Creeper (4") 10 cm
Terebralia palustris (L., 1767). Indo-Pacific. Mangrove mud flats; abundant.



Australian Mud Creeper (4") 10 cm
Terebralia palustris sub-species *ceramica* (Link, 1807). Western Australia. Mangrove mud flats; common.



Telescope Snail (4") 10 cm
Telescopium telescopium (L., 1758). Indo-Pacific. Mangrove mud flats; abundant.



Black Faunus (2") 5 cm
Faunus ater (Born, 1778). Philippines; East Indies. Freshwater snail in family Thiariidae. Abundant.

THE CERITHS FAMILY CERITHIIDAE

The ceriths are a major family of mainly shallow-water dwellers, most distributed in the tropics. They live in large colonies feeding on mud detritus and decayed algae. Some genera are very small, such as *Bittium*, but most *Cerithium* are about an inch in size. Operculum horny and with only a few whorls (paucispiral).



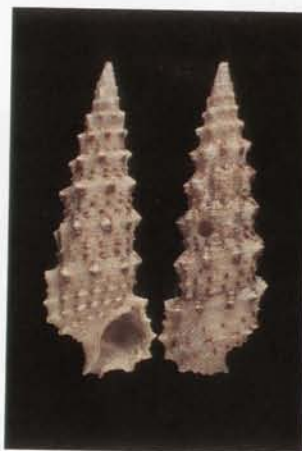
Giant Knobbed Cerith (5") 13 cm
Cerithium nodulosum (Bruguière, 1792). Indo-Pacific. Reef flats, shallow water; abundant.



Red Sea Cerith (4") 10 cm
Cerithium erythraeonense Lamarck, 1822. Red Sea. Shallow water; locally common.



European Cerith (3") 7.5 cm
Cerithium vulgatum Bruguière, 1792. Mediterranean; West Africa. Subtidal rock areas; abundant.



Lifu Cerith (1.5") 4 cm
Cerithium lifuensis Melvill & Standen, 1895. Central Pacific. Subtidal grass flats; locally common.



Strong Cerith (2") 5 cm
Cerithium munitum Sowerby, 1855. S. W. Pacific. Subtidal, grass and sand flats; uncommon.



Zoned Cerith (1.2") 3 cm
Clypeomorus zonatus (Wood, 1828). S. W. Pacific. Subtidal, sand; uncommon. Syn.: *lemniscatum* Q. & G.; *problema* Iredale.



Sutured Cerith (1.5") 3.5 cm
Cerithium suturale Philippi, 1849. S. W. Pacific. Subtidal, grass and sand; uncommon.



Thin-lined Cerith (1") 2.5 cm
Cerithium tenuifilum Sowerby, 1866. Indo-Pacific. Shallow water near coral reefs; common.



White-studded Cerith (1") 2.5 cm
Cerithium dialeucum Philippi, 1849. Indian Ocean. Shallow water; locally common.



Yellow Cerith (2") 5 cm
Cerithium citrinum Sowerby, 1855. N. E. Australia; Melanesia. Subtidal; uncommon.



New Holland Cerith (1.5") 4 cm
Cerithium novaehollandiae Sowerby, 1855. Northern Australia. Shallow water; locally common.



Uneven Cerith (1") 2.5 cm
Cerithium salebrosum Sowerby, 1855. Polynesia. Shallow sand and grass flats; common.



Column Cerith (1.5") 4 cm
Cerithium columna Sowerby, 1834. Tropical Pacific. Subtidal, sand; common. Syn.: *fusi-forme* Sowerby; *proditum* Bayle.



Rüppell's Cerith (1.5") 4 cm
Cerithium ruppellii Philippi, 1849. Red Sea. Shallow water; locally common.



Channeled Cerith (0.7") 1.8 cm
Cerithium alveolus Hombron & Jaquinot, 1854. Indo-Pacific. Weedy sand shallows; common. Syn.: *piperitum* Sowerby.



Stocky Cerith (1") 2.5 cm
Cerithium litteratum (Born, 1778). S. E. Florida to Brazil. Subtidal; common. Syn.: *semi-ferrugineum* Lamarck.



Ivory Cerith (0.8") 2 cm
Cerithium eburneum Bruguière, 1792. S. E. Florida and West Indies. Subtidal, sand; common. Syn.: *algicola* C. B. Adams (pointed beads).



Dwarf Atlantic Cerith
(0.4") 1 cm
Cerithium lutosum Menke, 1828. S. E. United States; West Indies; Bermuda. Intertidal; abundant.



Florida Cerith (1.3") 3 cm
Cerithium atratum (Born, 1778). S. E. United States to Brazil. Subtidal, in weeds; common. Syn.: *floridanum* Mörch.



Fly-specked Cerith (1") 2.5 cm
Cerithium muscarum Say, 1832. Southern Florida; West Indies. Shallow semi-brackish waters; abundant.



Guinea Cerith (1.2") 3 cm
Cerithium guinaicum Philippi, 1849. Florida; Caribbean; West Africa. Subtidal; uncommon. Syn.: *auricoma* Schwengel.



Common Vertagus (2") 5 cm
Rhinoclavis vertagus (L., 1758). Indo-Pacific. Intertidal to 13 m on sand; abundant. Yellow or white.



Banded Vertagus (3") 8 cm
Rhinoclavis fasciata (Bruguière, 1792). Indo-Pacific. Subtidal to 18 m; abundant. Syn.: *procerum* Kiener; *pharos* Hinds.



Rough Vertagus (2") 5 cm
Rhinoclavis aspera (L., 1758). Indo-Pacific. Subtidal to 28 m; common. White or banded.



Obelisk Vertagus (2") 5 cm
Rhinoclavis sinensis (Gmelin, 1791). Indo-Pacific. Intertidal to 23 m; abundant. Syn.: *obeliscus* Bruguière.



Articulate Vertagus
(1.8") 4.5 cm
Rhinoclavis articulata (Adams & Reeve, 1850). Indo-Pacific. Subtidal to 91 m; somewhat common.



Koch's Vertagus (1.5") 3.5 cm
Rhinoclavis kochi (Philippi, 1848). Indo-Pacific. Sand bottom, 2-62 m; uncommon. Syn.: *recurvum* Sowerby.



Brettingham's Vertagus (2") 5 cm
Rhinoclavis brettinhami Cernohorsky, 1974. N.W. Australia. Intertidal; common. Syn.: *pulchrum* Sowerby.



Bituberculate Vertagus (2") 5 cm
Rhinoclavis bituberculata (Sowerby, 1855). N. Australia; New Guinea. Intertidal; common. Syn.: *semigranosum* Lamarck.



Gem Vertagus (1.5") 4 cm
Rhinoclavis gemmata (Hinds, 1844). Gulf of California to Ecuador. Subtidal to 130 m; common. Syn.: *tenuisculptum* Sowerby.



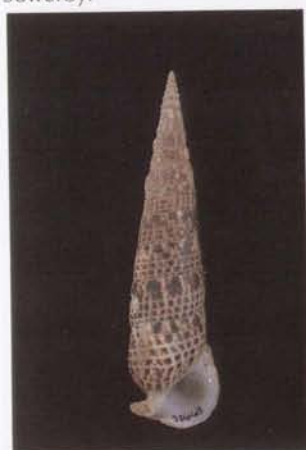
Long-snouted Vertagus (2") 5 cm
Rhinoclavis longicaudata (Adams & Reeve, 1850). S. E. Asia; Fiji. Uncommon. Syn.: *attenuatum* Philippi.



Aluco Vertagus (3") 7.5 cm
Pseudovertagus aluco (L., 1758). S. W. Pacific. Intertidal to 9 m, sand; common. Smoothish to knobbed.



Noble Vertagus (5") 12 cm
Pseudovertagus nobilis (Reeve, 1855). Central East Africa and S. W. Pacific. 18 to 88 m; sand; rare.



Amulet Vertagus (3") 7.5 cm
Pseudovertagus phylarchus (Iredale, 1929). Philippines to Australia. Offshore, 5-30 m; uncommon.



Club Vertagus (5") 13 cm
Pseudovertagus clava (Gmelin, 1791). Lower Polynesia to Australia; S. E. Africa. Subtidal to 40 m; common.



Morus Cerith (0.5") 1.2 cm
Clypeomorus concisus (Hombron & Jacquinot, 1854). Indo-Pacific. Shallow water; abundant. Syn.: *morus* Lamarck.



Necklace Cerith (0.5") 1.2 cm
Clypeomorus moniliferus (Kiener, 1841). Indo-Pacific. Shallow water; common.



Short Cerith (0.6") 1.5 cm
Clypeomorus brevis (Quoy & Gaimard, 1834). Indo-Pacific. Shallow water; common. Syn.: *patiens* Bayle.



Chemnitz Cerith (1.5") 3.5 cm
Clypeomorus chemnitziana (Pilsbry, 1901). S. W. Pacific. Shallow water reef flats; uncommon.



Stony Cerith (1.2") 3 cm
Clypeomorus petrosus (Wood, 1828). S. W. Pacific. Shallow water reefs; common.



Swarthy Cerith (1.6") 4 cm
Cerithium adustum Kiener, 1841. W. Mexico to Ecuador. In sand among intertidal rocks; common.



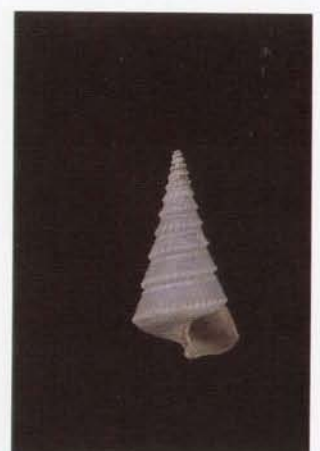
Bent Cerith (0.5") 1.2 cm
Clypeomorus aduncus (Gould, 1849). Philippines. Shallow water; rare.



Gourmya Cerith (2") 5 cm
Gourmya gourmyi (Crosse, 1861). New Caledonia and New Hebrides. Offshore, shallow water; locally common.



Ribbon Cerith (2") 5 cm
Clavocerithium taeniatum (Quoy & Gaimard, 1834). New Guinea. Offshore, 2-20 m; locally common.



Pagoda Cerith (1") 2.5 cm
Trochocerithium tectiforme (Watson, 1884). Japan. Deep water; uncommon.



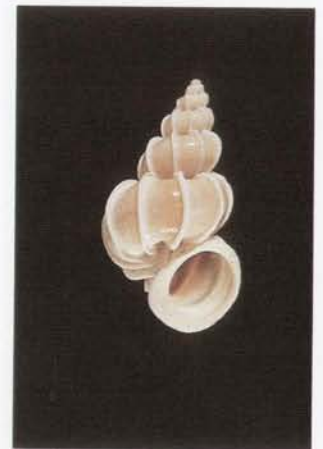
Bell Clapper (8") 20 cm
Campanile symbolicum Iredale, 1917. Western Australia. Offshore to 10 m. Locally uncommon.



Carinate False Cerith (1.5") 3.5 cm
Fastigiella carinata Reeve, 1848. Bahamas and northern Cuba. Shallow water; rare.

WENTLETRAPS FAMILY EPITONIIDAE

The wentletraps are popular collector's items because of their intricate ribbing. The 200 or so known species live in all seas from shallow to very deep water. The operculum is corneous, thin, and with a few whorls. Some feed on sea anemones. The Epitoniidae, Janthinidae and Architectonicidae belong to a recently accepted order, Heterogastropoda.



Precious Wentletrap (2.5") 6 cm
Epitonium scalare (L., 1758). Japan to S. W. Pacific. Subtidal to 29 m; locally common. Syn.: *pretiosum* Lamarck.



Lamellose Wentletrap (1") 2.5 cm
Epitonium lamellosum (Lamarck, 1822). Southern Florida; Caribbean; Europe. Subtidal to 66 m; common.



Western Atlantic Wentletrap (1") 2.5 cm
Epitonium occidentale (Nyst, 1871). S. E. Florida to Brazil. 1 to 120 m; fairly common.



Imperial Wentletrap (1") 2.5 cm
Epitonium imperiale (Sowerby, 1844). S. W. Pacific. Subtidal, sand; uncommon.



Guinea Wentletrap (2") 5 cm
Amaea guineensis (Bouchet & Tellier, 1978.) West Africa. Offshore; uncommon.



Greenland Wentletrap (2") 5 cm
Epitonium greenlandicum (Perry, 1811). Circumpolar in north. 30 to 260 m; common. Syn.: *loveni* A. Adams.



Mitchell's Wentletrap (2") 5 cm
Amaea mitchelli (Dall, 1896). Texas to eastern Panama. Offshore, shallow water; uncommon.



Blaine's Wentletrap (1.5") 3.5 cm
Epitonium blainei Clench & Turner, 1953. Southern Florida. Offshore to 44 m; rare. Holotype specimen.



Dall's Wentletrap (1.5") 4 cm
Cirsotrema dalli Rehder, 1945. S. E. United States to Brazil. 36 to 150 m; uncommon. Holotype specimen.



Ferminia Wentletrap (1.5") 4 cm
Amaea ferminiana (Dall, 1908). W. Mexico to W. Colombia. Offshore; rare. Similar *retifera* (Dall, 1889) is from Caribbean.



Few-ribbed Wentletrap (1") 2.5 cm
Cirsotrema rariforme (Lamarck, 1822). Indian Ocean. Subtidal under rocks; uncommon.



Abbreviated Wentletrap (1") 2.5 cm
Cirsotrema abbreviatum (Sowerby, 1874). East Indies. Shallow water; uncommon. Slender form of *varicosum*?



Acuminate Wentletrap (1.5") 4 cm
Epitonium acuminatum (Sowerby, 1844). Japan to Australia. Shallow water; uncommon.



Annulate Wentletrap (1.5") 4 cm
Epitonium annulatum Kuroda & Ito, 1961. Japan; deep water; uncommon.



Gaze Wentletrap (1.5") 3.5 cm
Amaea gazeoides (Kuroda & Habe, 1950). Southern Japan. Offshore; rare.



Varicose Wentletrap (2") 5 cm
Cirsotrema varicosum (Lamarck, 1822). Japan; S. W. Pacific. Offshore; uncommon.



Decussate Wentletrap (1") 2.5 cm
Amaea decussata (Lamarck, 1804). Indo-Pacific. Offshore to 30 m; uncommon.



Common Wentletrap (1.2") 3 cm
Epitonium clathrum (L., 1758).
Western Europe; Mediterranean. Intertidal; common.



Zeledor Wentletrap (1") 2.5 cm
Cirsoctrema zeledori (Dunker, 1866). New Zealand. Offshore to 30 m; uncommon.



Magellanic Wentletrap (1.2") 3 cm
Epitonium magellanicum (Philippi, 1845). Argentina and Chile. 55 to 100 m; common.



Spiral Wentletrap (1.5") 4 cm
Eglisia spirata (Sowerby, 1825).
Western Africa; West Indies. Offshore to 200 m; uncommon.



Gould's Wentletrap (1") 2.5 cm
Alora gouldi (A. Adams, 1857).
W. Mexico to Panama. Offshore; rare.



Noble Wentletrap (1.5") 4 cm
Sthenorytis pernobilis (Fischer & Bernardi, 1857). S. E. United States; Caribbean. 100 to 1,600 m; rare.

PURPLE SEA SNAILS FAMILY JANTHINIDAE

The fragile, purple sea snails live pelagic lives afloat on the open, tropical seas, buoyed up by mucus-covered bubbles. Often cast ashore after storms. They feed on other floating sea creatures. Some species are worldwide. All *Janthina* are purple; *Recluzia* with a yellow float and a brown shell. They are blind.



Common Janthina (1.5") 4 cm
Janthina janthina (L., 1758).
Worldwide, tropical seas. Common.



Elongate Janthina (1") 2.5 cm
Janthina globosa Swainson, 1822. Caribbean; western Pacific. Pelagic; common. Syn.: *prolongata* Blainville.



Dwarf Janthina (0.2") 5 mm
Janthina exigua Lamarck, 1816. Worldwide, warm seas. Pelagic; uncommon.



Pallid Janthina (1") 2.5 cm
Janthina pallida (Thompson, 1840). Worldwide, warm seas. Pelagic; uncommon. Globular shape.



Recluzia Snail (1") 2.5 cm
Recluzia lutea (Bennett, 1840). Caribbean; Indo-Pacific. Pelagic; rare. Syn.: *palmeri* Dall (holotype illustrated).



Helicoid Vanikoro (1") 2.5 cm
Vanikoro helicoidea (Guillou, 1842). Indo-Pacific. Shallow water; common. Syn.: *semiplicata* Pease. In family Vanikoroidae.



Cancellate Vanikoro (1") 2.5 cm
Vanikoro cancellata (Lamarck, 1822). Central and S. W. Pacific. Subtidal; moderately common.



Ligate Vanikoro (1.2") 3 cm
Vanikoro ligata (Récluz, 1844). S. W. Pacific. Subtidal on rocks; moderately common.



True Separatista (0.5") 1.2 cm
Separatista blainvilliana Petit, 1851. S. W. Pacific. Subtidal; rare.



Helicoid Separatista (0.5") 1.2 cm
Lippistes helicoides (Gmelin, 1791). S. W. Pacific. Subtidal; rare.



Horn Separatista (0.5") 1.2 cm
Lippistes cornu (Gmelin, 1791). South Africa. Offshore to 60 m; rare.



Two-keeled Hairy-shell (1.5") 4 cm
Trichotropis bicarinata (Sowerby, 1825). Arctic Seas. Offshore to 10 m; locally common. In family Trichotropidae.



Cancellate Hairy-shell (1") 2.5 cm
Trichotropis cancellata (Hinds, 1843). Bering Sea to Oregon. Offshore to 20 m; common.



Gray Hairy-shell (1") 2.5 cm
Trichotropis insignis Middendorff, 1849. Alaska to northern Japan. Offshore to 50 m; uncommon.



One-ribbed Hairy-shell (0.6") 1.5 cm
Iphinoe uncarinata (Broderip & Sowerby, 1829). Japan and Korea. 85 to 250 m; uncommon.



Miraculous Torellia (1.5") 3.6 cm
Torellia mirabilis E. A. Smith, 1907. Antarctic Seas. Offshore; locally uncommon.

HOOF-SHELLS FAMILIES HIPPONICIDAE and CAPULIDAE

The shells of hoof (Hipponicidae) and cap (Capulidae) shells resemble limpets, but the animals are prosobranchs with one set of gills and 7 rows of teeth. The shells usually have an outer rough "skin" or periostracum. Eggs are brooded under the female's shell.



Trigonal Hoof-shell (0.7") 1.8 cm
Pilosabia trigona (Gmelin, 1791). S. W. Pacific; Japan. Subtidal, on rocks and shells; common. Syn.: *barbatus* Sowerby.



Orange Hoof-shell (0.5") 1.2 cm
Pilosabia subrufa (Lamarck, 1819). Caribbean; Eastern Pacific; Indo-Pacific. Syn.: *tumens* Carpenter.



Fool's Cap (2") 5 cm
Capulus ungaricus (L., 1767). Iceland to Mediterranean. Offshore; on rocks; locally common.



California Cap (1.5") 3.8 cm
Capulus californicus Dall, 1900. California to W. Mexico. Offshore, usually attached to *Pecten* shells; rare.



Deepsea Cap (1") 2.5 cm
Malluvium lissus (E. A. Smith, 1894). S. W. Pacific. Deep water; on sea urchin spines; rare.

SLIPPER SHELLS FAMILY CREPIDULIDAE

The slipper shells and cup-and-saucer shells have either an internal shelf or a small cup to protect the soft organs of the snail. *Crepidula* usually live one on top of the other. There is no operculum.



Atlantic Slipper (1.5") 3.5 cm
Crepidula fornicata (L., 1758). Eastern United States; northwestern Europe. Subtidal on rocks and shells; abundant.



Spotted Slipper (1.2") 3 cm
Crepidula maculosa Conrad, 1846. S. E. United States; Bahamas. Subtidal; on other shells; common.



Costate Slipper (2") 5 cm
Crepidula costata Sowerby, 1824. New Zealand. Subtidal on mussels and rocks; abundant.



Dilated Slipper (2.5") 6 cm
Crepidula dilatata Lamarck, 1822. Chile, Peru and Argentina. Subtidal on rocks; common.



False Cup-and-saucer (1") 2.5 cm
Cheilea equestris (L., 1758). Florida to Brazil; W. Mexico to Chile; Indo-Pacific. Offshore on rocks; uncommon.



Conic Cup-and-saucer (1") 2.5 cm
Calyptrea conica Broderip, 1834. W. Mexico to Ecuador. Offshore to 37 m; common.



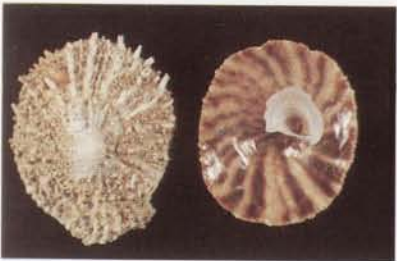
Cape Cup-and-saucer (1.3") 3 cm
Calyptrea capensis Tomlin, 1931. South Africa. Offshore on rocks; uncommon. Form of *chinensis*?



Chinese Cup-and-saucer (0.6") 1.5 cm
Calyptrea chinensis (L., 1758). Europe. Subtidal on rocks; common.



West Indian Cup-and-saucer (1") 2.5 cm
Crucibulum auricula (Gmelin, 1791). S. E. United States to Brazil. Subtidal to 60 m; uncommon.



Spiny Cup-and-saucer (1") 2.5 cm
Crucibulum spinosum (Sowerby, 1824). Southern California to Chile. Subtidal to 60 m; common on rocks and shells.



Shield Cup-and-saucer (2") 5 cm
Crucibulum scutellatum (Wood, 1828). W. Mexico to Ecuador. Subtidal on shells and rocks; common. Syn.: *imbricata* Sowerby.



Trochita Shell (3") 7 cm
Trochita trochiformis (Born, 1778). Ecuador to Peru. Offshore; moderately common.

CARRIER-SHELLS FAMILY XENOPHORIDAE

Most carrier-shells cement sea-floor debris to their shells, often obliterating surface features. Basically trochoidal in shape they are usually dull, coarsely ornamented and fragile. Corneous operculum assists animal in *Strombus*-like movements. Found in tropical and warm seas.



Atlantic Carrier-shell (2") 5 cm
Xenophora conchyliophora (Born, 1780). North Carolina to West Indies, Brazil; Bermuda. Shallow water; moderately common. Syn.: *onustus* Reeve.



Longley's Carrier-shell (5") 13 cm
Tugurium longleyi (Bartsch, 1931). North Carolina to Barbados. Dredged, 70-450 fms; uncommon. Strong, curved growth lines on base.



Caribbean Carrier-shell (2.5") 6 cm
Tugurium caribaeum (Petit, 1856). Brazil, South Carolina to West Indies. Dredged, 75-300 fms; moderately common. Small umbilicus.



Great Carrier-shell (4.5") 11 cm
Tugurium giganteum (Schepman, 1909). Japan; Indonesia; South Africa. On mud, deep water; uncommon. Ventral view.



Great Carrier-shell (4.5") 11 cm
Tugurium giganteum (Schepman, 1909). Top view; few attachments at periphery of whorls.



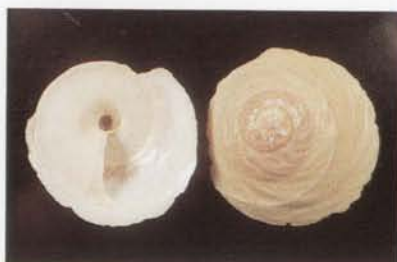
Mediterranean Carrier-shell (1.5") 4 cm
Xenophora crista (Koenig, 1831). Mediterranean and adjacent eastern Atlantic. Deep water; rare. Syn.: *mediterranea* Tiberi.



Digitate Carrier-shell (3") 7.5 cm
Xenophora digitata von Marten, 1878. West Africa. Offshore, mud, 5 to 30 m; locally common.



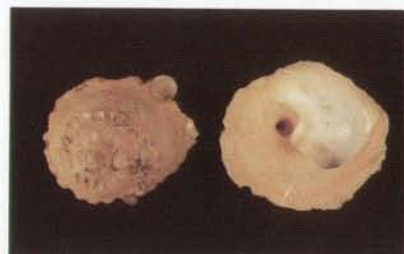
Torrida Carrier-shell (1.4") 3.5 cm
Xenophora torrida Kuroda & Ito, 1961. Japan and Ryukyu Islands. 20 to 80 m; uncommon. *X. turrida* is a misspelling.



Indian Carrier-shell (3") 7.5 cm
Tugurium indicum (Gmelin, 1791). Indo-W. Pacific. Shallow water; uncommon. Attachments only on early whorls. Syn.: *helvacea* Philippi; *wagneri* Philippi.



Barren Carrier-shell (3") 7.5 cm
Tugurium exutum (Reeve, 1843). Indo-W. Pacific. Shallow water; uncommon. Rarely attaches more than sand grains at apex.



Fragment Carrier-shell (3") 7.5 cm
Xenophora calculifera (Reeve, 1843). Indo-W. Pacific. Shallow water; uncommon. Syn.: *sinensis* Philippi.



Solar Carrier-shell (1") 2.5 cm
Xenophora solarioides (Reeve, 1845). Indo-Pacific. Shallow water; uncommon. Among smallest in genus.



Australian Carrier-shell (2.5") 6 cm
Xenophora neozelanica form *peroniana* Iredale, 1929. Southern Australia. Offshore, to 150 m; uncommon. *X. tatei* Cossman is a fossil.



Japan Carrier-shell (2") 5 cm
Xenophora japonica Kuroda & Habe, 1971. Japan, Taiwan, Philippines. Shelly and gravelly places, 50 to 300 m; uncommon.



Thin Carrier-shell (2") 5 cm
Xenophora tenuis Fulton, 1934. South of Honshu, Japan. Dredged, 50 to 80 fms; uncommon.



Rough Carrier-shell (2") 5 cm
Xenophora corrugata (Reeve, 1843). Indo-W. Pacific. Moderately deep water; moderately common. Umbilicus sometimes present.



Sunburst Carrier-shell (3.5") 7.5 cm
Stellaria solaris (L., 1767). Indo-Pacific. Offshore to considerable depths; common. No attachments at any stage of growth.



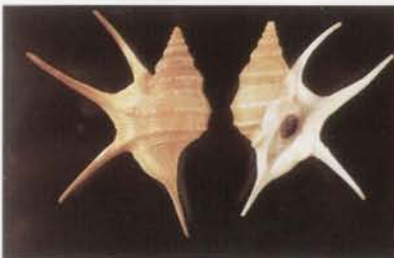
Pallid Carrier-shell (2.5") 6.5 cm
Xenophora pallidula (Reeve, 1842). Indo-W. Pacific; South Africa. Offshore to deep water; common. Wide variety of attached objects.



Remarkable Ostrich-foot (1.5") 3.5 cm
Perissodonta mirabilis E. A. Smith, 1907. South Georgia and Kerguelen Islands. Deep water; rare.



Common Pelican's-foot (2") 5 cm
Aporrhais pespelecani (L., 1758). From Lofoten Islands to Mediterranean. Offshore to 140 m; common. Syn.: *michaudi* Locard; *sarsi* Kobelt.



African Pelican's-foot (2") 5 cm
Aporrhais pesgallinae Barnard, 1963. Southwest Africa, Angola. In sand, moderately deep water; uncommon.

OSTRICH-FOOT SHELLS
FAMILY STRUTHIOLARIIDAE

Small family of medium-size gastropods noted for the thickened outer lip of their shells, supposedly resembling an ostrich foot. The large aperture has a short siphonal canal. Elongate foot has small corneous operculum used in locomotion. Species, mostly from New Zealand, are sand dwellers.



Large Ostrich-foot (2.5") 6.5 cm
Struthiolaria papulosa (Martyn, 1784). New Zealand. In sand, littoral and shallow water offshore; common.

PELICAN'S-FOOT SHELLS
FAMILY APORRHAIIDAE

Small to medium-size gastropods with shells distinguished by pointed processes on outer lip from which they get their popular name. Animal has flattened footsole and a small operculum and makes lunging movements like *Strombus*. The minute egg cases are soft walled and are deposited in sand.



American Pelican's-foot (2") 5 cm
Aporrhais occidentalis Beck, 1836. Arctic Canada to North Carolina. Offshore to 350 fms; common. Syn.: *mainensis* Johnson (holotype on right); *labradorensis* Johnson.



MacAndrew's Pelican's-foot (1.3") 3.5 cm
Aporrhais serresianus macandreae Jeffreys, 1867. Norway to Mediterranean. Deep water; uncommon. Syn.: *pescarbonis* Forbes & Hanley.



Senegal Pelican's-foot (1") 2.5 cm
Aporrhais senegalensis Gray, 1838. West Africa. Offshore, 60 to 80 fms; uncommon. Smallest member of genus.

TRUE CONCHS
FAMILY STROMBIDAE

Includes several genera differing widely among themselves in shell features, but closely allied anatomically. Most shells have a "stromboid notch" near anterior end. Animals herbivorous and make leaping movements using strong, horny, curved operculum. Eggs laid in long gelatinous strands.



Pink Conch (8") 20 cm
Strombus gigas L., 1758. Southeast Florida; Bermuda; West Indies. On sand, littoral and offshore; common. Syn.: *verrilli* McGinty. At left is young shell.



Three-knobbed Conch (4") 10 cm
Strombus tricornis Lightfoot, 1786. Red Sea and Gulf of Aden. Shallow water; common.



Thersite Stromb (5.5") 14 cm
Strombus thersites Swainson, 1823. S.W. Pacific. Offshore, 5 to 10 fms; rare. Syn.: *ponderosus* Philippi.



Widest Pacific Conch (6") 16 cm
Strombus latissimus L., 1758. S. W. Pacific. 4 to 20 m; uncommon. Syn.: *picta* Röding.



Bull Conch (3.5") 9 cm
Strombus taurus Reeve, 1857. Marshall and Marianas Islands, Pacific. Coral rubble or rock, to 15 fms; rare.



Lacinate Conch (4") 10 cm
Strombus sinuatus Lightfoot, 1786. S. W. Pacific. Coral sand, to 10 fms; uncommon. Syn.: *laciniatus* Dillwyn.



Hawk-wing Conch (3.5") 9 cm
Strombus raninus Gmelin, 1791. S. E. Florida to Brazil. Shallow water; common. Syn.: *bituberculatus* Lamarck.



Milk Conch (5.5") 14 cm
Strombus costatus Gmelin, 1791. Southern Florida; West Indies; Brazil; Bermuda. Shallow water; common.



Rooster-tail Conch (5") 12.5 cm
Strombus gallus L., 1758. S. E. Florida; West Indies; Brazil; Bermuda. Offshore to 10 m; uncommon.



Giant Eastern Pacific Conch (7") 18 cm
Strombus galeatus Swainson, 1823. Gulf of California to Ecuador. Shallow water; uncommon.



Goliath Conch (13") 33 cm
Strombus goliath Schröter, 1805. Brazil (endemic). On sand offshore; uncommon. Largest of all *Strombus*.



Kleckham's Conch (2") 5 cm
Strombus kleckhamae Cernohorsky, 1971. New Britain and New Guinea. 1 to 20 m; rare.



Kleckham's Conch (2") 5 cm
Strombus kleckhamae Cernohorsky, 1971. Dorsal view. Spiral bands often present.



Peruvian Conch (5") 13 cm
Strombus peruvianus Swainson, 1823. West Mexico to northern Peru. Tide pools at about low-tide mark; common.



Florida Fighting Conch (3") 8 cm
Strombus alatus Gmelin, 1791. North Carolina to Florida and Texas. On sand and gravel, shallow water; common.



West Indian Fighting Conch (3") 8 cm
Strombus pugilis L., 1758. Southeast Florida; West Indies; Brazil. On sand and grass, to 5 fms; common.



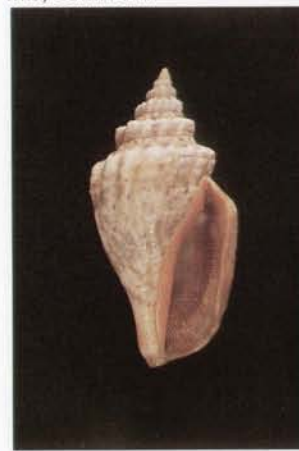
Eastern Pacific Fighting Conch (3") 8 cm
Strombus gracilior Sowerby, 1825. Gulf of California to Peru. On sand and mud, to 45 m; common.



Dog Conch (2.5") 6.5 cm
Strombus canarium L., 1758. S. W. Pacific. Shallow water; common. Syn.: *isabella* Lamarck.



Little Bear Conch (1.7") 4.5 cm
Strombus urceus L., 1758. Western Pacific. Sand and mud, to 20 fms; common. Syn.: *incisus* Wood; *anatellus* Duclos.



Plicate Conch (1.5") 4 cm
Strombus labiatus (Röding, 1798). East Indian Ocean; western Pacific. Shallow water; common. Syn.: *plicatus* Lam.



Micro Conch (1") 2.5 cm
Strombus microurceus (Kira, 1959). Indonesia to southern Japan and Samoa. On sand and coral to 12 fms; uncommon.



Mutable Conch (1") 2.5 cm
Strombus mutabilis Swainson, 1821. Tropical Indo-Pacific. Coral sand, to 10 fms; common. Syn.: *floridus* Lamarck.



Maculated Conch (1") 2.5 cm
Strombus maculatus Sowerby, 1842. Central Pacific. Shallow water; common. Syn.: *depauperata* Dautz. & Bouge.



Elegant Conch (1.3") 3.2 cm
Strombus erythrinus erythrinus Dillwyn, 1817. Indo-Pacific. In sand offshore, to 30 fms; uncommon. Syn.: *elegans* Sowerby.



Rugose Conch (1.2") 3 cm
Strombus rugosus Sowerby, 1825. Fiji, Ellice, Samoan and Tonga Islands. Shallow water; uncommon. Columella white.



Fusiform Conch (1.5") 3.8 cm
Strombus fusiformis Sowerby, 1842. Red Sea; western Indian Ocean. On coral sand to 35 fms; locally common.



Lavender-mouth Conch (0.8") 2 cm
Strombus haemastoma Sowerby, 1842. Western Indian Ocean, tropical Pacific. Uncommon. More slender than *S. heli*.



Hell's Conch (0.8") 2 cm
Strombus heli Kiener, 1843. Hawaiian Islands. On coral sand and rubble, 6 to 240 fms; uncommon.



Samar Conch (1.5") 4 cm
Strombus dentatus L., 1758. East Africa, tropical Pacific. On coral sand, to 50 fms; uncommon. Syn.: *samarensis* Reeve.



Fragile Conch (1.5") 4 cm
Strombus fragilis (Röding, 1798). Western and Central Pacific. On sand, 2 to 50 fms; uncommon.



Little Auger Conch (1.5") 4 cm
Strombus terebellatus terebellatus Sowerby, 1842. S. W. Pacific. Uncommon.



African Auger Conch (1.2") 3 cm
Strombus terebellatus afrobellatus Abbott, 1960. East Africa. Shallow water; uncommon.



Plicate Conch (2.3") 6 cm
Strombus plicatus plicatus (Röding, 1798). Red Sea. Uncommon. Has 4 subspecies.



Pigeon Conch (1.5") 4 cm
Strombus plicatus columba Lamarck, 1822. Western Indian Ocean. On coral sand, to 45 fms; common.



Sibbald's Conch (1.2") 3 cm
Strombus plicatus sibbaldi Sowerby, 1842. Gulf of Aden to Sri Lanka. Uncommon. Characteristically stunted.



Pretty Conch (1.2") 3 cm
Strombus plicatus pulchellus Reeve, 1851. Southern Japan to Micronesia and Melanesia. 8 to 50 fms; uncommon.



Dilate Conch (2") 5 cm
Strombus dilatatus Swainson, 1821. S. W. Pacific. On sand and mud, 4 to 40 fms; uncommon. Syn.: *orosminus* Duclos.



Marginate Conch (2") 5 cm
Strombus marginatus L., 1758.
Southern India. Shallow water;
common.



Septimus Conch (1.5") 4 cm
Strombus marginatus sub-
species *septimus* Duclos, 1844.
Philippines. Common.



Tunic Conch (1.8") 4.5 cm
Strombus marginatus succinctus L., 1767. Madras to Sri Lanka. Muddy sand, shallow water; uncommon.



Solid Conch (1.8") 4.5 cm
Strombus marginatus robustus Sowerby, 1874. Japan to South China Sea. On sand and mud, to 25 fms; common.



Minute Conch (1") 2.5 cm
Strombus minimus L., 1771.
South China Sea to Fiji. Sand or mud, to 12 fms; common. Chrome-yellow aperture.



Variable Conch (2") 5 cm
Strombus variabilis Swainson, 1820. Northwest Pacific. Sandy mud, to 25 fms; moderately common.



Lip Conch (1") 2.5 cm
Strombus labiosus Wood, 1828. Indo-Pacific. Offshore to 50 m; uncommon. With or without apertural purple blotch.



Swan Conch (3") 7.5 cm
Strombus epidromis L., 1758. Philippines; Indonesia to New Caledonia. Mud and sand, to 16 fms; uncommon.



Vittate Conch (3") 7.5 cm
Strombus vittatus vittatus L., 1758. South China Sea, south-east to Fiji. Offshore; uncommon. Syn.: *turritus* Lamarck.



Japanese Conch (2.2") 5.5 cm
Strombus vittatus japonicus Reeve, 1851. Japan. Offshore, 5 to 20 fms; common.



Campbell's Conch (2") 5 cm
Strombus vittatus campbelli Griffith & Pidgeon, 1834. North Australia. Offshore to 12 fms; common. Syn.: *sulcata* Watson.



Lister's Conch (5") 13 cm
Strombus listeri T. Gray, 1852. Bay of Bengal; N. W. Indian Ocean. Moderately deep water; uncommon.



Old's Conch (4") 10 cm
Strombus oldi Emerson, 1965.
Somali coast, East Africa. Off-
shore; rare. Has dark-brown
stain in the aperture.



Silver Conch (3") 7.5 cm
Strombus lentiginosus L., 1758.
Tropical Indo-Pacific. On coral
sand, to 2 fms; common. Or-
ange and cream aperture.



Butterfly Conch (2.3") 6 cm
Strombus pipus (Röding, 1798).
Tropical Indo-Pacific. On coral
sand, 8 to 40 fms; uncommon.
Syn.: *papilio* Dillwyn.



Granulated Conch (3") 7.5 cm
Strombus granulatus Swainson,
1822. Gulf of California to Ecua-
dor. On rocks and sand off-
shore; common.



Bubonian Conch (4.5") 11 cm
Strombus latus Gmelin, 1791.
Western Africa, Cape Verde Is-
lands. Shallow water; com-
mon. Syn.: *bubonius* Lamarck.



Lineated Conch (1.5") 4 cm
Strombus fasciatus Born, 1778.
Red Sea. In sand, shallow wa-
ter; common. Syn.: *lineatus* La-
marck.



Diana Conch (2.3") 6 cm
Strombus aurisdianae L., 1758.
Indo-W. Pacific. In weedy sand,
shallow water; moderately
common. Syn.: *chrysostomus*
Kuroda.



Bubble Conch (2.3") 6 cm
Strombus bulla (Röding, 1798).
Indonesia to Samoa. On sand
to 10 fms; uncommon. Syn.:
guttata Kiener.



Vomer Conch (3") 7.5 cm
Strombus vomer vomer (Rö-
ding, 1798). S. W. Pacific. On
sand, shallow water; uncom-
mon. Syn.: *pacificus* Swainson.



Iredale's Conch (2.5") 6.5 cm
Strombus vomer iredalei Ab-
bott, 1960. Northern Australia.
Shallow water; uncommon.
Syn.: *australis* Gray.



Strawberry Conch (2") 5 cm
Strombus luhuanus L., 1758.
Western Pacific; east Australia;
Japan. On sand, to 5 fms; com-
mon. Black columella.



Mauritian Conch (2.2") 5.5 cm
Strombus decorus decorus
(Röding, 1798). Indian Ocean.
On sand, to 18 fms; common.
Columella whitish. Syn.:
mauritanus Lamarck.



Persian Conch (1.8") 4.5 cm
Strombus decorus persicus
Swainson, 1821. Arabian Sea
and Persian Gulf. In sand, to 10
fms; common.



Hump-back Conch (2.2") 5.5 cm
Strombus gibberulus gibberu-
lus L., 1758. Indian Ocean. In-
tertidal to 10 fms; common.
Largest of 3 subspecies.



Gibbose Conch (1.8") 4.5 cm
Strombus gibberulus gibbosus
(Röding, 1798). Tropical Pacific,
excluding Hawaii. Intertidal to
10 fms; common.



White Hump-back Conch (1.8")
4.5 cm *Strombus gibberulus al-*
bus Mörch, 1850. Red Sea and
Gulf of Aden. Intertidal to 10
fms; moderately common.



Common Spider Conch (7")
18 cm *Lambis lambis* (L., 1758).
Indo-Pacific. Shallow water;
common. Females have longer
"fingers" than males.



Orange Spider Conch (4.5")
11 cm *Lambis crocata crocata*
(Link, 1807). Indo-W. Pacific.
On reefs; moderately com-
mon. Syn.: *aurantia* Lamarck.



Pilsbry's Spider Conch
(8") 20 cm
Lambis crocata pilsbryi Abbott,
1961. Marquesas Islands (en-
demic). Uncommon.



Scorpio Conch (5") 13 cm
Lambis scorpius scorpius (L.,
1758). Western Pacific. Coral
reef areas, shallow water; mod-
erately common.



Lesser Scorpio Conch (5") 13 cm
Lambis scorpius indomaris Ab-
bott, 1961. Indian Ocean. Shal-
low water; uncommon. Syn.:
sinuatus Perry.



False Scorpio Conch (5") 13 cm
Lambis robusta (Swainson,
1821). Southeastern Polynesia.
Rare. Syn.: *pseudoscorpio* La-
marck.



Violet Spider Conch (3.5") 9 cm
Lambis violacea (Swainson,
1821). Western Indian Ocean.
Moderately deep water; rare.
Syn.: *multipes* Deshayes.



Milleped Spider Conch (4")
10 cm *Lambis millepeda* (L.,
1758). S. W. Pacific. Shallow wa-
ter; moderately common. Nor-
mally has 9 "fingers".



Elongate Spider Conch
(4.7") 12 cm
Lambis digitata (Perry, 1811). Indo-Pacific. Shallow water; uncommon. Syn.: *elongata* Swainson.



Seba's Spider Conch (11") 28 cm
Lambis truncata subspecies *sebae* (Kiener, 1843). Pacific; Red Sea. Shallow water; common. Spire of true *truncata* is flat.



Chiragra Spider Conch (6")
15 cm *Lambis chiragra* (L., 1758). Eastern Indian Ocean to Polynesia. Shallow water; common. Syn.: *rugosa* Sowerby.



Arthritic Spider Conch (6")
15 cm *Lambis chiragra* subspecies *arthritica* Röding, 1798. Eastern Africa. Coral reef areas. Shallow water; common.



Cancellate Beak-shell
(1.2") 3 cm
Varicospira cancellata (Lamarck, 1822). Indo-Pacific. Off-shore; uncommon. Posterior canal covers 2 spire whorls.



Network Beak-shell (1") 2.5 cm
Varicospira crispata (Sowerby, 1842). Philippines. Deep water; moderately rare. Posterior canal short and recurved.



Arabian Tibia (5.5") 14 cm
Tibia insulaechorab Röding, 1798. Indian Ocean. Intertidal to moderate depths; common. Syn.: *curvirostris* Lamarck.



Shin-bone Tibia (9") 23 cm
Tibia fusus fusus (L., 1758). Southwest Pacific, mainly Philippines. Moderately deep water; moderately common.



Dark-mouthed Tibia (6") 15 cm
Tibia fusus melanocheilus (A. Adams, 1854). Philippines; Indonesia. Shallow water; uncommon. Syntypes illustrated.



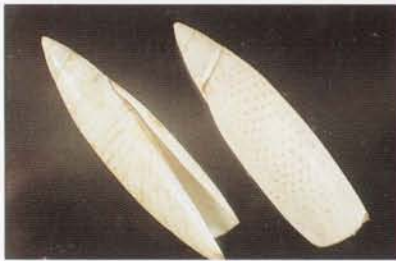
Martin's Tibia (5.5") 14 cm
Tibia martinii (Marrat, 1877). Philippines; Taiwan; Indonesia. Deep water; moderately rare.



Delicate Tibia (3") 8 cm
Tibia delicatula (Nevill, 1881). Arabian Sea. Deep water; moderately rare. Syn.: *nana* Romagna-Manoja.



Powis's Tibia (2.2") 5.5 cm
Tibia powisi (Petit, 1842). Southwest Pacific; Australia. Dredged in moderately deep water; uncommon.



Terebellum Conch (2.4") 6 cm
Terebellum terebellum (L., 1758). Indo-Pacific. Subtidal in sand; locally common. Patterns often zebra-like or spotted.

FAMILIES LAMELLARIIDAE AND TRIVIIDAE

The Lamellariidae have a very thin shell covered by the mantle. No operculum. The Eratoidea and Triviidae contain the *Erato* and cowrie-like *Trivia*, respectively. Most live in the tropics and feed upon sponge-like, ascidian "sea potatoes." All live below the tidal level under rocks. No operculum.



Black Lamellaria (1.2") 3 cm
Lamellaria niger (Blainville, 1825). Indo-Pacific. Subtidal, under rocks; uncommon. Shell internal in black soft parts.



Smooth Velutina (0.7") 1.8 cm
Velutina velutina (Müller, 1776). Arctic Seas. Offshore to 100 m; locally common in gravel.



Columbella Erato (0.3") 7 mm
Erato columbella Menke, 1847. California to Panama. Subtidal to 100 m; near kelp weeds; common.



Four-spotted Trivia (0.2") 5 mm
Trivia quadripunctata (Gray, 1827). S. E. United States and West Indies. Subtidal under rocks; common.



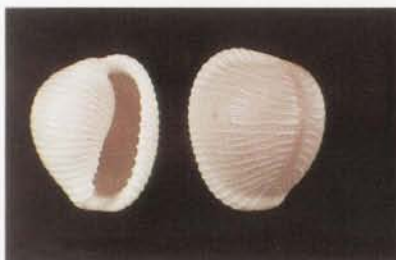
Radians Trivia (0.7") 1.8 cm
Trivia radians (Lamarck, 1811). W. Mexico to Ecuador. Intertidal, under rocks; common. More ribs than *solandri*.



Solander's Trivia (0.6") 1.5 cm
Trivia solandri (Sowerby, 1832). Southern California to Peru. Intertidal, under rocks; common.



Coffee Bean Trivia (0.5") 1.2 cm
Trivia pedicula (L., 1758). S. E. United States to Brazil. Bermuda. Subtidal, under rocks; common.



Gaping Trivia (0.8") 2 cm
Trivia aperta (Swainson, 1822). South Africa. Offshore; common, especially in beach drift.

COWRIES FAMILY CYPRAEIDAE

Among the most popular of all seashells, cowries number about 200 living species. The aperture is restricted and usually toothed, the surface glossy and smooth. All are from warm seas. They are omnivorous, lay circular egg masses and sit on them. Their mantles are often as colorful as their shells.



Marie's Cowrie (0.5") 1.2 cm
Cypraea mariae Schilder, 1927. Central Pacific; Philippines. On soft coral, shallow and deeper water; rare. Syn.: *annulata* Gray.



Chick-pea Cowrie (0.8") 2 cm
Cypraea cicercula L., 1758. Indo-Pacific. On live coral, shallow and deeper water; uncommon.



Lienard's Chick-pea Cowrie (0.5") 1.2 cm
Cypraea cicercula subspecies *lienardi* Jous-seaume, 1874. S. W. Pacific. Granulated, unspotted.



Margarite Chick-pea Cowrie (0.5") 1.2 cm
Cypraea cicercula form *margarita* Dillwyn, 1817. S. W. Pacific. Shallow water; uncommon. Top smooth.



Maui Chick-pea Cowrie (0.7") 1.8 cm
Cypraea mauiensis Burgess, 1967. Hawaiian Islands. Offshore; uncommon.



Globular Cowrie (0.8") 2 cm
Cypraea globulus L., 1758. Indo-Pacific. On live coral, shallow water; uncommon. Dorsum quite smooth. Syn.: *affinis* Gmelin.



Checkerboard Cowrie (1.4") 3.5 cm
Cypraea tessellata Swainson, 1822. Hawaiian Islands. Under coral and in reef crevices, to 20 fms; uncommon.



Children's Cowrie (0.8") 2 cm
Cypraea childreni Gray, 1825. Indo-Pacific. Shallow water; rare.



Surinam Cowrie (1.4") 3.5 cm
Cypraea surinamensis Perry, 1811. Southern Florida to Brazil. Offshore to 140 m; rare. Syn.: *bicallosa* Gray; *ingloria* Crosse.



Dillwyn's Cowrie (0.5") 1.2 cm
Cypraea dillwyni Schilder, 1922. Polynesia and Fiji Islands. On coral reefs, shallow and deeper water; uncommon.



Beck's Cowrie (0.5") 1.2 cm
Cypraea beckii Gaskoin, 1836. Philippines; Japan; Hawaii. Coral reefs, shallow and deeper water; rare.



MacAndrew's Cowrie (1") 2.3 cm
Cypraea macandrewi Sowerby, 1870. Northwest Indian Ocean; Red Sea. Subtidal, uncommon.



Dew-drop Cowrie (0.5") 1.2 cm
Cypraea irrorata Gray, 1828. Central Pacific. Coral reefs, shallow and deeper water; uncommon. Seldom collected living.



Grape Cowrie (0.8") 2 cm
Cypraea staphylaea L., 1758. Indo-Pacific. In and under coral blocks, shallow water; uncommon. Orange teeth across entire base.



Limacina Cowrie (1") 2.5 cm
Cypraea limacina Lamarck, 1810. Indo-W. Pacific. Under stones; moderately common. Nodules on dorsum.



Semiplota Cowrie (0.6") 1.5 cm
Cypraea semiplota Mighels, 1845. Hawaiian Islands. Offshore; uncommon (rare alive). Syn.: *polita* Roberts.



Nucleus Cowrie (1") 2.5 cm
Cypraea nucleus L., 1758. Indo-Pacific. Coral reefs, shallow water; uncommon. Form *gemmosa* Perry illustrated.



Granulated Cowrie (1.5") 4 cm
Cypraea granulata Pease, 1862. Hawaiian Islands; Marquesas. Coral reefs; moderately rare. Syn.: *honoluluensis* Melvill.



Lined-lip Cowrie (0.8") 2 cm
Cypraea labrolineata Gaskoin, 1849. Central to Western Pacific. Coral reefs; uncommon. Syn.: *helenae* Roberts; *maccullochi* Iredale.



Cernica Cowrie (1") 2.5 cm
Cypraea cernica Sowerby, 1870. Indo-Pacific. On coral and sand, moderately deep water; uncommon. Syn.: *tomlini* Schilder.



Contaminated Cowrie (0.5") 1.2 cm
Cypraea contaminata Sowerby, 1832. Indo-W. Pacific. Shallow water; moderately rare.



Gangrenous Cowrie (0.8") 2 cm
Cypraea gangranosa Dillwyn, 1817. Indian Ocean to New Guinea (mostly from Sri Lanka or Andaman Islands); uncommon.



Boivin's Cowrie (1.2") 3 cm
Cypraea boivini Kiener, 1843. Japan; Philippines; Indonesia. Under rocks and coral slabs; moderately common.



Atlantic Yellow Cowrie (1") 2.5 cm
Cypraea spurca acicularis Gmelin, 1791. S. Florida; West Indies. Moderately common. Has white base. True *spurca* from Eastern Atlantic is yellow.



Albugine Cowrie (1") 2.5 cm
Cypraea albuginea Gray, 1825. Gulf of California; W. Mexico; Panama to Ecuador. Under stones, shallow water; common.



Honey Cowrie (1") 2.5 cm
Cypraea helvola L., 1758. Indo-Pacific. Coral areas; common. Syn.: *hawaiiensis* Melvill; *citrinicolor* Iredale.



King's Cowrie (0.7") 1.8 cm
Cypraea kingae Rehder & Wilson, 1975. Off Pitcairn Island. Dredged, 25 to 70 fms; rare. Holotype illustrated at left.



Thomas's Cowrie (0.6") 1.5 cm
Cypraea thomasi Crosse, 1865. Hawaii; Central Pacific. Offshore, rare. Syn.: *ostergaardi* Dall.



Serpent's-head Cowrie (1") 2.5 cm
Cypraea caputserpentis L., 1758. Indo-Pacific. Coral reefs, shallow water; common. Syn.: *caputanguis* Philippi; *caputcolubri* Kenyon.



Father Englert's Cowrie (1") 2.5 cm
Cypraea englerti Summers & Burgess, 1965. Easter Island. Intertidal; rare.



Dragon's-head Cowrie (1") 2.5 cm
Cypraea caputdraconis Melvill, 1888. Easter Island (endemic). Locally common. Holotype illustrated.



Erosa Cowrie (1.5") 4 cm
Cypraea erosa L., 1758. Indo-Pacific. Coral reefs, in shallow water; common. Syn.: *similis* Gmelin; *chlorizans* Melvill.



Lamarck's Cowrie • (1.5") 4 cm
Cypraea lamarckii Gray, 1825. Indian Ocean. Shallow, muddy water; moderately common. Syn.: *redimita* Melvill; *incurvata*, *beieri*, *sharoni*, *okutanii*, all Walles, 1980.



Porous Cowrie (0.8") 2 cm
Cypraea poraria L., 1758. Indo-Pacific. Coral reefs, shallow water; common. Syn.: *kauaiensis* Melvill; *vibex* Kenyon.



Ocellate Cowrie (1") 2.5 cm
Cypraea ocellata L., 1758. India; Sri Lanka, Gulf of Oman, Persian Gulf. Among muddy stones at low tide; moderately common.



Margin Cowrie (1.2") 3 cm
Cypraea marginalis Dillwyn, 1817. South Africa; western Indian Ocean; Gulf of Oman; uncommon.



Miliaris Cowrie (1.2") 3 cm
Cypraea miliaris Gmelin, 1791. Western Pacific; northern Australia. Shallow water; common. Syn.: *magistra* Melvill.



Lamarck's Cowrie (1.5") 4 cm
Cypraea lamarckii Gray, 1825. Indian Ocean. Shallow, muddy water; moderately common. Syn.: *redimita* Melvill; *incurvata*, *beieri*, *sharoni*, *okutanii*, all Walles, 1980.



Thrush Cowrie (1.2") 3 cm
Cypraea turdus Lamarck, 1810. Western Indian Ocean; Red Sea. On dead coral or among muddy stones, to 10 fms; common.



Great Spotted Cowrie (2.3") 6 cm
Cypraea guttata Gmelin, 1791. S. W. Pacific; Japan. Coral reefs to moderate depths; rare. Syn.: *azumai* Schilder.



Gold-ringer Cowrie (1") 2.5 cm
Cypraea annulus L., 1758. Indo-Pacific. Coral reefs, shallow water; common. Syn.: *noumeensis* Marie; *camelorum* Rochebrune.



Walled Cowrie (0.8") 2 cm
Cypraea obvelata Lamarck, 1810. Eastern Polynesia. Coral reefs, in tide pools; common. Probably subspecies of *annulus*.



Money Cowrie (1") 2.5 cm
Cypraea moneta L., 1758. Indo-Pacific. One of the most variable cowries. Syn.: *icterina* Lamarck; *barthelemyi* Bernardi.



Agate Cowrie (1.4") 3.5 cm
Cypraea achatidea Sowerby, 1837. Eastern Mediterranean and West Africa. From 30 m to deep water; rare. Syn.: *oranica* Crosse.



Zoned Cowrie (1.2") 3 cm
Cypraea zonaria Gmelin, 1791. West Africa; Cape Verde Islands. On reefs, to 10 m; common. Syn.: *zonata* Lamarck.



Ornate Cowrie (1") 2.5 cm
Cypraea picta Gray, 1824. Cape Verde Islands. Among coral slabs, shallow water; uncommon. Syn.: *atava* Rochebrune.



Black-spotted Cowrie (1.2") 3 cm
Cypraea nigropunctata Gray, 1828. Galapagos; Ecuador; northern Peru. Shallow water; common. Syn.: *irina* Kiener.



Annette's Cowrie (1.5") 4 cm
Cypraea annettae Dall, 1909. Gulf of California, Baja California. Under stones, low tide; common. Syn.: *sowerbyi* Kiener.



Equinox Cowrie (1.6") 4 cm
Cypraea aequinoctialis Schilder, 1933. West Panama to Peru. Shallow water; uncommon to rare.



Chestnut Cowrie (2.2") 5.5 cm
Cypraea spadicea Swainson, 1823. California to central Baja California. Under rock ledges to 20 m; common.



Little Arabian Cowrie (1.2") 3 cm
Cypraea arabicula Lamarck, 1811. Baja California to Peru; Galapagos. Under rocks at low tide; common.



Wonder Cowrie (3.5") 9 cm
Cypraea armeniaca form *howelli* Iredale, 1931 (left); form *hesitata* Iredale, 1916 (right). Southeast Australia, offshore; uncommon.



Armenian Cowrie (3.5") 9 cm
Cypraea armeniaca Verco, 1912. South and Southeast Australia. Deep-water form. Rare. Occasionally albino.



Verheof's Cowrie * (1.5") 4 cm
Cypraea verheofi Burgess, 1982. South Africa. Offshore. This is a beach-worn specimen. Syn.: *castanea* Higgins.



Dark-toothed Cowrie (1.2") 3 cm
Cypraea fuscudentata Gray, 1825. South Africa. Moderately deep water; uncommon (but rare live collected).



Toothless Cape Cowrie (1") 2.5 cm
Cypraea edentula Gray, 1825. South Africa. Probably from deep water; common (as a beached shell).



Yellow-toothed Cowrie (1.2") 3 cm
Cypraea xanthodon Sowerby, 1832. North-eastern Australia. Coral reefs, shallow water; uncommon. Teeth and base yellowish.



Pallid Cowrie (1") 2.5 cm
Cypraea pallida Gray, 1824. N. Indian Ocean to Borneo. Under muddy rocks, low tide; uncommon. Syn.: *insulicola* Schilder & Schilder.



Greenish Cowrie (1.2") 3 cm
Cypraea subviridis Reeve, 1835. N. Australia to Fiji. Coral areas, under rocks; uncommon. Syn.: *anceyi* Vayssière.



Onyx Cowrie (1.5") 4 cm
Cypraea onyx L., 1758. Indo-W. Pacific. Coral reefs and muddy areas; uncommon. (right: white form, *nymphae* Jay, 1850)



Dark Onyx Cowrie (1.5") 4 cm
Cypraea onyx form *adusta* Lamarck, 1810. Indo-Pacific. Moderately common color form.



Petit's Cowrie (1") 2.5 cm
Cypraea petitiana Crosse, 1872. Off Dakar and Gambia. Trawled down to 40 m; moderately rare.



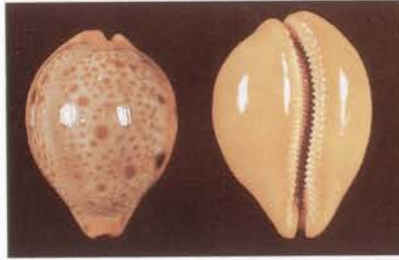
Hirase's Cowrie (2.3") 6 cm
Cypraea hirasei Roberts, 1913. East China Sea; Japan; Queensland. Trawled, to 100 fms; rare. Syn.: *queenslandica* Schilder.



Langford's Cowrie (2") 5 cm
Cypraea langfordi Kuroda, 1938. Japan to northern Australia. Dredged, 40 to 100 fms; rare. The form *moretonensis* Schilder is doubtfully distinct.



Teramachi's Cowrie (2.7") 7 cm
Cypraea teramachii Kuroda, 1938. Japan; South China Sea. Trawled in moderately deep water; rare.



Porter's Cowrie (2") 5 cm
Cypraea porteri C. Cate, 1966. Philippines. Deep water; rare. *C. joycae* Clover is Taiwan subspecies.



Pear-shaped Cowrie (1") 2.5 cm
Cypraea pyriformis Gray, 1824. Malaysia; Philippines; western Australia. Shallow water; uncommon. Syn.: *smithi* Sowerby.



Beautiful Cowrie (1.5") 4 cm
Cypraea pulchella Swainson, 1823. Indo-Pacific. Dredged 15 to 70 fms; uncommon. Syn.: *pericalles* Melvill & Standen.



Barclay's Cowrie (1") 2.5 cm
Cypraea barclayi Reeve, 1857. Indian Ocean. Deep water. Known only from about a dozen specimens. 21 outer lip teeth, strong, orange. Syn.: *weaveri* Walles, 1980.



Walker's Cowrie (1") 2.5 cm
Cypraea walkeri Sowerby, 1832. Indian Ocean; S. W. Pacific. Coral reefs; uncommon. Syn.: *amabilis* Jousseaume; *merista* Iredale.



Breger's Cowrie (1") 2.5 cm
Cypraea bregeriana Crosse, 1868. Solomons to New Caledonia and Fiji. Coral reefs, shallow water; uncommon. Tiny white spots imbedded in the nacre.



Golden-mouth Cowrie (1.2") 3 cm
Cypraea ovum Gmelin, 1791. S. W. Pacific. Coral reefs; common. Yellowish teeth distinctive. Syn.: *cruenta* Gmelin; *olivacea* Lamarck.



Wandering Cowrie (1") 2.5 cm
Cypraea errones L., 1758. Western Pacific and eastern Indian Ocean. Coral reef areas; common. Syn.: *bimaculata* Gray; *coxi* Brazier.



Sowerby's Cowrie (1") 2.5 cm
Cypraea cylindrica form *sowerbyana* Schilder, 1932. Southwest Pacific. Shallow water; uncommon. Teeth much shorter.



Cylindrical Cowrie (1") 2.5 cm
Cypraea cylindrica Born, 1778. S. W. Pacific; Philippines. Shallow water; common. Syn.: *subcylindrica* Sowerby.



Four-spotted Cowrie (1") 2.5 cm
Cypraea quadrimaculata Gray, 1824. S. W. Pacific. Under stones and coral slabs; uncommon. Syn.: *nimbosa* Dillwyn.



Caurica Cowrie (1.5") 4 cm
Cypraea caurica L., 1758. Indo-Pacific. An extremely variable shallow-water species; common. Syn.: *obscura* Rossiter.



Compton's Cowrie (1") 2.5 cm
Cypraea comptonii Gray, 1847. South Australia; Tasmania. Intertidal; common. Syn.: *wilkinsi* Griffiths; *trenberthae* Trenberth.



Flea-bitten Cowrie (0.7") 1.8 cm
Cypraea pulicaria Reeve, 1846. Southwest Australia. Intertidal to 10 m; common.



Peppered Cowrie (1.3") 2 cm
Cypraea piperita Gray, 1825. Southern coast of Australia. Subtidal to 5 m; common. Syn.: *bicolor* Gaskoin.



Plump Cowrie (1.4") 3.5 cm
Cypraea angustata Gmelin, 1791. Southeast Australia; Tasmania. Under rocks, to 10 m; moderately common. Syn.: *emblema* Iredale; *molleri* Iredale.



Martin's Cowrie (0.7") 1.8 cm
Cypraea martini Schepman, 1907. Philippines to New Caledonia. Coral and rock seabeds; rare. Syn.: *superstes* Schilder.



Punctate Cowrie (0.8") 2 cm
Cypraea punctata L., 1771. Indo-Pacific. Coral reefs, shallow and deeper water; uncommon. Syn.: *peristicta* Iredale.



Asellus Cowrie (0.8") 2 cm
Cypraea asellus L., 1758. Indo-Pacific. Coral reefs, under stones and coral blocks; moderately common.



Saul's Cowrie (1") 2.5 cm
Cypraea saulae Gaskoin, 1843. Western Pacific. Coral reefs; moderately rare. Syn.: *nugata* Iredale; *siasiensis* C. Cate.



Clandestine Cowrie (0.8") 2 cm
Cypraea clandestina L., 1767. Indo-W. Pacific. Coral reefs, shallow water; moderately common. Syn.: *candida* Pease.



Sakurai's Cowrie (2") 5 cm
Cypraea sakuraii (Habe, 1970). Taiwan to Philippines. Deep water; uncommon.



Musume's Cowrie (1") 2.5 cm
Cypraea musumea (Kuroda & Habe, 1961). Japan. Offshore; uncommon.



Midway Cowrie (0.7") 1.8 cm
Cypraea midwayensis (Azuma & Kuroda, 1967). Midway Island. Deep water; rare. Like *C. hungerfordi* but smaller and teeth finer.



Katsua's Cowrie (0.7") 1.8 cm
Cypraea katsuae Kuroda, 1950. Southern Japan to Philippines. Offshore in deep water; rare.



Chinese Cowrie (1.5") 4 cm
Cypraea chinensis Gmelin, 1791. Central and western Pacific; Eastern Africa. Coral reefs, to 20 fms; uncommon.



Coloba Cowrie (1.5") 4 cm
Cypraea chinensis subspecies *coloba* Melvill, 1888. Northern Indian Ocean. Intertidal; locally common.



Lutea Cowrie (0.7") 1.8 cm
Cypraea lutea Gmelin, 1791. S. W. Pacific; N. Australia. Shallow reefs; uncommon.



Humphrey's Cowrie (0.7") 1.8 cm
Cypraea humphreysi Gray, 1825. Fiji; Solomons; Coral Sea. Under coral and among weed; uncommon. Syn.: *yaloka* Steadman & Cotton.



Zigzag Cowrie (0.8") 2 cm
Cypraea ziczac L., 1758. Indo-Pacific. In and under coral heads, shallow and deep water; uncommon. Syn.: *misella* Perry; *signata* Iredale.



Undulating Cowrie (0.8") 2 cm
Cypraea ziczac form *undata* Lamarck, 1810. A variation in which the base is reddish. Uncommon.



Roberts's Cowrie (1") 2.5 cm
Cypraea robertsi Hidalgo, 1906. Gulf of Calif. to Peru, Galapagos. Under rocks at low tide; common. Syn.: *punctulata* Gray.



Freckled Cowrie (1.2") 3 cm
Cypraea lentiginosa Gray, 1825. Persian Gulf; northern Arabian Sea. Among coral and stones, to about 10 fms; uncommon.



Fimbriate Cowrie (0.7") 1.8 cm
Cypraea fimbriata Gmelin, 1791. Indo-Pacific; South Africa. Shallow water; uncommon. Syn.: *waikiensis* Schilder.



Cat Cowrie (0.7") 1.8 cm
Cypraea felina Gmelin, 1791. Indo-W. Pacific. Coral reefs, under stones; common. Syn.: *listeri* Gray; *melvilli* Hidalgo.



Hammond's Cowrie (0.6") 1.5 cm
Cypraea hammondae Iredale, 1939. Philippines to N. Australia. Subtidal; uncommon. This is form *raysummersi* Schilder, 1960.



Graceful Cowrie (1") 2.5 cm
Cypraea gracilis Gaskoin, 1849. Indo-Pacific. Coral reefs; moderately common. Syn.: *notata* Gill; *irescens* Sowerby.



Small-toothed Cowrie (0.3") 1 cm
Cypraea minoridens Melvill, 1901. Southwest Pacific; Japan to Samoa. Near coral, subtidal; uncommon.



Coxen's Cowrie (1") 2.5 cm
Cypraea coxeni Cox, 1873. New Guinea to Solomons. Shallow water; locally common. Syn.: *hesperina* Schilder & Summers.



Summers's Cowrie (0.7") 1.8 cm
Cypraea summersi Schilder, 1958. Fiji, Samoa and Tonga. Coral reefs in shallow water; uncommon. Brown smudges on anterior tip.



Rhinoceros Cowrie (1") 2.5 cm
Cypraea pallidula Gaskoin, 1849. Northern Australia to Japan and Samoa. Coral reef areas; uncommon. Syn.: *rhinoceros* Soubervie.



Kiener's Cowrie (0.7") 1.8 cm
Cypraea kieneri Hidalgo, 1906. Indo-Pacific. Shallow water; common. Syn.: *marcia* Iredale. Central teeth short.



Swallow Cowrie (0.7") 1.8 cm
Cypraea hirundo L., 1758. Indo-Pacific. Under coral slabs; moderately common. Syn.: *neglecta* Sowerby. Central teeth long.



Little Bear Cowrie (0.5") 1.2 cm
Cypraea ursellus Gmelin, 1791. Western Pacific. Under coral, shallow water; uncommon. Syn.: *coffea* Sowerby; *amoeba* Schilder & Schilder.



Red Sea Cowrie (1") 2.5 cm
Cypraea erythraeensis Sowerby, 1837. Red Sea. Subtidal, under rocks; locally common.



Rashleigh's Cowrie (1") 2.5 cm
Cypraea rashleighana Melville, 1888. Hawaiian Islands to S. E. Asia. In branched coral offshore; uncommon. Syn.: *eunota* Taylor.



Teres Cowrie (1.5") 4 cm
Cypraea teres Gmelin, 1791. Indo-Pacific. Coral reef areas mainly; common. Syn.: *tabescens* Dillwyn.



Stolid Cowrie (1") 2.5 cm
Cypraea stolidia L., 1758. Indo-W. Pacific. Under stones and in coral heads, shallow water; uncommon. Syn.: *crossei* Marie.



Rostrate Stolid Cowrie (1") 2.5 cm
Cypraea stolidia L., 1758. Several kinds of cowries in New Caledonia have ecologic black and rostrate forms.



Subteres Cowrie (1") 2.5 cm
Cypraea subteres Weinkauff, 1881. Polynesia. Coral reefs; live-collected specimens rare. Large brown spots on right margin.



Goodall's Cowrie (0.8") 2 cm
Cypraea goodallii Sowerby, 1832. Marianas to Society Is., central Pacific. Coral areas; moderately rare. Syn.: *fuscomaculata* Pease.



Sieve Cowrie (1") 2.5 cm
Cypraea cribraria L., 1758. Indo-Pacific. Shallow reefs; uncommon. Syn.: *comma* Perry; *fallax* Smith; *melwardi* Iredale



Fine-sieve Cowrie (0.7") 1.8 cm
Cypraea cribellum Gaskoin, 1849. Mauritius and Reunion. Subtidal; rare.



Esontropia Cowrie (1") 2.5 cm
Cypraea esontropia Duclos, 1833. Mauritius. Under coral blocks; moderately common. Has larger dorsal spots than *C. gaskoini*.



Catholic Cowrie (0.8") 2 cm
Cypraea catholicorum Schilder & Schilder, 1938. New Britain to New Caledonia. Coral reefs, usually beach collected; rare.



Gaskoin's Cowrie (1") 2.5 cm
Cypraea gaskoini Reeve, 1846. Hawaiian Islands to Fiji. In coral, to 20 fms; uncommon. Syn.: *peasei* Sowerby.



Cuming's Cowrie (0.5") 1.2 cm
Cypraea cumingii Sowerby, 1832. Eastern Polynesia. Coral reefs, shallow water; rare. Syn.: *compta* Pease; *cleopatra* Schilder & Schilder.



Teulère's Cowrie (2") 5 cm
Cypraea teulerei Cazanavelle, 1845. Red Sea to Gulf of Oman. Offshore; locally common. Syn.: *leucostoma* Gaskoin; *hidalgoi* Shaw.



Fulton's Cowrie (2.5") 6.4 cm
Cypraea fultoni Sowerby, 1903. South Africa. From fish stomachs; rare. Possibly a deep-water species.



Mouse Cowrie (2") 5 cm
Cypraea mus L., 1758. Northern coast of Colombia to Gulf of Venezuela. On and under rocks offshore; uncommon.



Don Moore's Cowrie (2.2") 5.5 cm
Cypraea mus form *donmoorei* Petuch, 1979. Northern Venezuela. Offshore to 50 m; locally common.



Venusta Cowrie (3") 7.5 cm
Cypraea venusta Sowerby, 1846. Southwestern Australia. On sponges, 2 to 100 fms; moderately rare. Syn.: *thatcheri* Cox; *catei* Schilder.



Thatcher's Cowrie (3") 7.5 cm
Cypraea venusta form *thatcheri* Cox, 1869. Southwestern Australia. This is merely a blond color form.



Deceptive Cowrie (2.3") 6 cm
Cypraea decipiens E. A. Smith, 1880. Northwestern Australia. On sponges, 10 to 40 fms; locally common. Remarkably humped shell.



Perla Cowrie (2.3") 6 cm
Cypraea decipiens form *perlae* Lopez & Chiang, 1975. Northwestern Australia. Deep-water form; uncommon.



Friend's Cowrie (3") 7.5 cm
Cypraea friendii friendii Gray, 1831. Western Australia. On sponges, to 100 fms; uncommon. Syn.: *scottii* Broderip; *vercoi* Schilder.



Thersites Cowrie (2.7") 7 cm
Cypraea friendii form *thersites* Gaskoin, 1849. Southern Australia. On sponges, to 40 fms; uncommon.



Jean's Cowrie (2.7") 7 cm
Cypraea friendii form *jeaniana* Cate, 1968. Southwestern Australia. Uncommon.



Marginate Cowrie (2.4") 6 cm
Cypraea marginata Gaskoin, 1849. Western and southern Australia. In coral with sponges, 12 to 250 m; rare. Syn.: *ketyana* Raybaudi.



Rossell's Cowrie (2") 5 cm
Cypraea rosselli (Cotton, 1948). Western Australia. On sponges, 3 to 40 fms, but occasionally beach collected; rare. Last 9 cowries in subgenus *Zoila*.



Atlantic Gray Cowrie (1.2") 3 cm
Cypraea cinerea Gmelin, 1791. S. E. United States to Brazil. Under rocks on reefs; moderately common.



Pear Cowrie (1.8") 4.5 cm
Cypraea pyrum Gmelin, 1791. Mediterranean; Western Africa. Offshore to about 50 m; common. Syn.: *maculosa* Gmelin; *rufa* Lamarck.



Lurid Cowrie (1.8") 4.5 cm
Cypraea lurida L., 1758. Mediterranean; West Africa; Ascension Island. Shallow water; common. Syn.: *minima* Dunker.



Isabelle Cowrie (1.5") 4 cm
Cypraea isabella L., 1758. Indo-Pacific. Coral reefs; common. Animal has jet black mantle. Syn.: *controversa* Gray.



Mexican Cowrie (1.5") 4 cm
Cypraea isabella subspecies *isabellamexicana* Stearns, 1893. Gulf of California to Panama; Galapagos. Under stones; uncommon.



Lovely Cowrie (2") 5 cm
Cypraea pulchra Gray, 1824. Red Sea to Gulf of Oman and Persian Gulf. In branched coral, to about 7 fms; uncommon.



Broderip's Cowrie (3") 7.5 cm
Cypraea broderipi Sowerby, 1832. Madagascar to south of Durban. Usually from fish stomachs; rare.



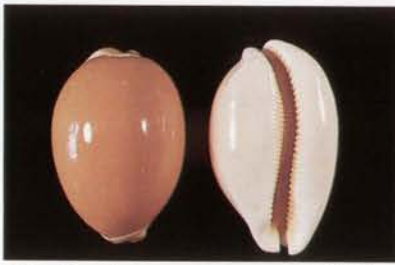
White-toothed Cowrie (3.2") 8.2 cm
Cypraea leucodon Broderip, 1828. Philippines (and ? Maldiv Islands). Moderately deep water; rare. Syn.: *angioyna* Raybaudi.



White-toothed Cowrie (3.2") 8.2 cm
Cypraea leucodon Broderip, 1828. Deep-water tangle nets set in the Philippines are now obtaining specimens frequently.



Cape Cowrie (1.2") 3 cm
Cypraea capensis Gray, 1828. S. Africa. Deep water; moderately common. Ridges extend around shell.



Golden Cowrie (3.5") 9 cm
Cypraea aurantium Gmelin, 1791. Philippines to Polynesia. In crevices and caves in coral reefs, 8 to 20 m; moderately rare.



Turtle Cowrie (4") 10 cm
Cypraea testudinaria L., 1758. Indo-Pacific. Subtidal shores; uncommon. Syn.: *ingens* Schilder & Schilder.



Rat Cowrie (3") 7.5 cm
Cypraea stercoraria L., 1758. Western Africa; Cape Verde Islands. Under rocks in shallow water; common. Varies greatly in size.



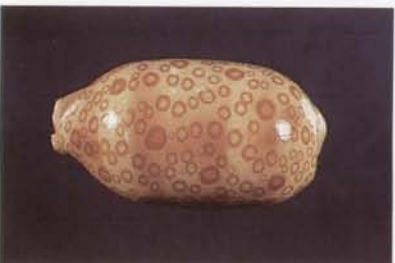
Measled Cowrie (3.3") 8.5 cm
Cypraea zebra L., 1758. North Carolina to Yucatan; West Indies; Brazil. Intertidal to 140 m; moderately common. Syn.: *exanthema* L.



Atlantic Deer Cowrie (4.5") 11.5 cm
Cypraea cervus L., 1771. North Carolina to Cuba; Bermuda. Low tide to about 10 fms; moderately common. The largest cowrie, reaching (7") 17 cm.



Panamanian Deer Cowrie (3") 7.5 cm
Cypraea cervinetta Kiener, 1843. Gulf of California to Peru. At low tide; common. Darker base than *cervus*. Syn.: *cervina* Lamarck.



Eyed Cowrie (3") 7.5 cm
Cypraea argus L., 1758. Indian Ocean; Southwest Pacific. Coral reefs; uncommon. Syn.: *contrastriata* Perry.



Mole Cowrie (2.5") 6.5 cm
Cypraea talpa L., 1758. Indo-Pacific. Coral reefs; common. Syn.: *saturata* Dautzenberg; *imperialis* Schilder & Schilder.



Exusta Cowrie (2.5") 6.5 cm
Cypraea exusta Sowerby, 1832. Red Sea and Gulf of Aden. A rare species resembling *talpa* but teeth finer and aperture more curved.



Prince Cowrie (3.5") 9 cm
Cypraea valentia Perry, 1811. Northern Australia; New Britain; Philippines. Moderately deep water; rare. Syn.: *princeps* Gray (type illustrated).



Map Cowrie (3") 7.5 cm
Cypraea mappa L., 1758. Indo-Pacific. Coral reefs, under slabs, shallow water; uncommon. Base may be pink. Syn.: *alga* Perry.



Jester Cowrie (1.7") 4.5 cm
Cypraea scurra Gmelin, 1791. Indo-Pacific. In coral heads, shallow and moderately deep water; uncommon. Syn.: *retifera* Menke; *antelia* Iredale.



Eglantine Cowrie (2.5") 6.5 cm
Cypraea eglantina Duclos, 1833. Central Pacific; Philippines; northern Australia. Coral areas; common. Brown spot at apex. Syn.: *niger* Roberts (black form).



Gray's Cowrie (2") 5 cm
Cypraea grayana Schilder, 1930. Northwest Indian Ocean. Offshore, in 1 to 20 m; rarely on reefs; locally common.



Arabian Cowrie (2.5") 6.5 cm
Cypraea arabica L., 1758. Indo-Pacific. Coral reefs, shallow water; common. No brown spot at apex. Syn.: *intermedia* Gray; *brunnescens* C. Cate.



Reticulated Cowrie (2.5") 6.5 cm
Cypraea maculifera Schilder, 1932. Central Pacific. Coral reefs, shallow water; common. Dark blotch on base. Syn.: *reticulata* Martyn.



Histro Cowrie (2.5") 6.5 cm
Cypraea histrio Gmelin, 1791. Indian Ocean. Under stones and coral slabs in tide pools; moderately common. Base all white.



Depressed Cowrie (1.5") 4 cm
Cypraea depressa Gray, 1824. Indo-Pacific. Coral reefs; locally common. Syn.: *intermedia* Redfield; *gillei* Jousseaume.



Humpback Cowrie (3") 7.5 cm
Cypraea mauritiana L., 1758. Indo-Pacific. Black rock shores, under rocks; common. Syn.: *regina* Gmelin; *adansonii* Blainville.



Tiger Cowrie (3.5") 9 cm
Cypraea tigris L., 1758. Indo-Pacific. Under coral rocks; common. Many color variations. Syn.: *schilderiana* C. Cate (large Hawaiian form).



Panther Cowrie (2.5") 6.5 cm
Cypraea pantherina Lightfoot, 1786. Red Sea and Gulf of Aden. Offshore, below 3 m; uncommon. Syn.: *vinosa* Gmelin; *tigrina* Lamarck.



Lynx Cowrie (1.5") 4 cm
Cypraea lynx L., 1758. Indo-Pacific. Coral reefs, shallow water; common. Syn.: *vanelli* L.; *caledonica* Crosse; *michaelis* Melvill.



Pacific Deer Cowrie (2.5") 6.5 cm
Cypraea vitellus L., 1758. Indo-Pacific; New Zealand. Under coral slabs and stones; common. Syn.: *sarcodes* Melvill.



Giraffe Cowrie (2.3") 6 cm
Cypraea camelopardalis Perry, 1811. Red Sea and Gulf of Aden. Offshore; uncommon. Columellar teeth stained black. Syn.: *melanostoma* Sowerby.



Ventral Cowrie (2") 5 cm
Cypraea ventriculus Lamarck, 1810. Central Pacific. Coral reefs, shallow water; uncommon. Heavier and broader than *schilderorum*.



Carnelian Cowrie (2.5") 6.5 cm
Cypraea carneola L., 1758. Indo-Pacific. Under coral slabs; common. Form *leviathan* Schilder & Schilder similar but larger.



Schilders' Cowrie (1.7") 4.5 cm
Cypraea schilderorum Iredale, 1939. Central Pacific; Hawaiian Islands. Coral reefs, down to 10 fms; uncommon. Syn.: *arenosa* Gray.



Kurohara's Cowrie (1.5") 4 cm
Cypraea schilderorum subspecies *kurohara* Kuroda & Habe, 1961. Japan and China. Deep water; uncommon.



Square-toothed Cowrie (1.5") 4 cm
Cypraea sulcidentata Gray, 1824. Hawaiian Islands (endemic). Associated with coral, to 20 fms; uncommon. Syn.: *xanthochrysa* Melvill.



Citrine Cowrie (1") 2.5 cm
Cypraea citrina Gray, 1825. South Africa. Shallow water; common (but rare living). Like *helvola* but lacks dark dorsal spots.



Reeve's Cowrie (1.4") 3.5 cm
Cypraea reevei Sowerby, 1832. S. W. and southern Australia. Intertidal rocky reefs; uncommon. Always looks immature.



Cruikshank's Cowrie (1") 2.5 cm
Cypraea cruikshanki Kilburn, 1972. South Africa. Deep water; rare. A very thin and light shell.



Pure White Cowrie (1.5") 4 cm
Cypraea eburnea Barnes, 1824. Southern Pacific from New Guinea to Fiji. On coral reefs under stones; uncommon. A uniquely all-white cowrie.



Cloudy Cowrie (2.3") 6 cm
Cypraea nivosa Broderip, 1837. Northwestern Indian Ocean. Shallow water; uncommon now, but formerly rare. Syn.: *dama* Gray.



Hungerford's Cowrie (1.5") 4 cm
Cypraea hungerfordi Sowerby, 1888. Japan. Trawled, 20 to 100 fms; uncommon. Form *coucomi* Schilder is from Queensland. Holotype *hungerfordi* illustrated.



Jenner's Cowrie (1") 2.5 cm
Jenneria pustulata (Lightfoot, 1786). Gulf of California to Ecuador. Near masses of stony coral; moderately common.

EGG SHELLS FAMILY OVULIDAE

The false, or allied, cowries are tropical in distribution and live in close association with colonial animals, such as soft corals, seafans and sponges. The soft mantle usually covers the egg- or spindle-shaped shell. There is no operculum. Most species occur in the Indo-Pacific.



Common Egg Cowrie (3") 7.5 cm
Ovula ovum (L., 1758). Indo-Pacific. Shallow water reefs on black sponges; common. Syn.: *oviformis* Lamarck.



Pink-mouth Ovula (1.5") 4 cm
Ovula costellata (Lamarck, 1810). Indo-Pacific. Shallow water; uncommon. Syn.: *tortilis* Reeve; *angulosa* Lamarck.



Tinted Ovula (1") 2.5 cm
Margovula tinctilis C. Cate, 1973. East Asia. Offshore; uncommon.



Umbilical Ovula (1.3") 3 cm
Calpurnus verrucosus (L., 1758). Indo-Pacific. Shallow reefs; locally common.



Ishibashi's Ovula (0.7") 1.8 cm
Prionovolva ishibashii (Kuroda, 1928). Southern Japan to Taiwan. Offshore; uncommon.



Chinese Ovula (0.7") 1.8 cm
Diminovula sinensis (Sowerby, 1874). Western Pacific; Japan. Offshore; uncommon.



Fruit Ovula (0.6") 1.5 cm
Prionovula fruticum (Reeve, 1865). Western Pacific; Japan. Offshore 10 to 40 m; uncommon.



Dwarf Red Ovula (0.7") 1.8 cm
Pseudosimnia carnea (Poiret, 1789). Mediterranean; N.W. Africa; West Indies. Uncommon. May be yellow or violet.



Adriatic Ovula (1") 2.4 cm
Aperiovula adriatica (Sowerby, 1828). Mediterranean. Among corals; uncommon. Syn.: *virginea* Cantraine.



Gold-banded Cyphoma (1") 2.5 cm
Pseudocyphoma aureocinctum Dall, 1899. Off Florida in 1,200 m; rare.



Intermediate Cyphoma (1.2") 3 cm
Pseudocyphoma intermedium (Sowerby, 1828). Florida to Brazil. Coral reefs; rare.



West Indian Simnia (0.5") 1.2 cm
Simnia acicularia (Lamarck, 1810). S.E. United States; West Indies; Bermuda. On seafans; locally common.



Rosy Ovula (0.6") 1.5 cm
Primovula rhodia (A. Adams, 1855). Japan to Taiwan. Subtidal to 30 m on gorgonians; uncommon.



Smith's Simnia (0.7") 1.8 cm
Subsimnia smithi (Bartsch, 1915). South Africa. Offshore on gorgonians; uncommon.



Flamingo Tongue (1") 2.5 cm
Cyphoma gibbosum (L., 1758). S.E. United States to Brazil; Bermuda. On seawhip and seafan gorgonians; common.



Flamingo Tongue (1") 2.5 cm
Cyphoma gibbosum (L., 1758). The mantle, spotted like a giraffe, stretches over outer shell.



Emarginate Cyphoma (0.7") 1.8 cm
Cyphoma emarginatum (Sowerby, 1830). W. Mexico. On gorgonians; uncommon.



Fingerprint Cyphoma (1.2") 3 cm
Cyphoma signatum Pilsbry & McGinty, 1939. S.E. United States; West Indies. Rare. Mantle with black stripes.



Macumba Cyphoma (0.8") 2.1 cm
Cyphoma macumba Petuch, 1979. Brazil. Near coral reefs; rare.



Shuttlecock Volva (4.5") 12 cm
Volva volva (L., 1758). Indo-Pacific. Near coral reefs; locally common.



Long-snouted Volva (2.5") 6.5 cm
Phenacovolva longirostrata (Sowerby, 1828). Japan. Offshore; uncommon. Holotype



Dance's Volva (1.5") 3.6 cm
Phenacovolva dancei Cate, 1973. Western Pacific. Offshore; rare. Right specimen is holotype.



Double-snouted Volva (1") 2 cm
Phenacovolva birostris (L., 1767). Japan to Philippines. On seafans; common. Syn.: *philippinarum* Sowerby.



Tokio's Volva (1.7") 4.5 cm
Phenacovolva tokioi Cate, 1973. Southwestern Pacific. On gorgonians offshore; uncommon.



Rehder's Volva (1.5") 4 cm
Phenacovolva rehderi Cate, 1973. Kii, Japan. Dredged in deep water; uncommon. Holotype illus.



Angas's Volva (1.2") 3 cm
Phenacovolva angasi (Reeve, 1865). Japan to Northern Australia. Offshore, probably on gorgonians; uncommon.

HETEROPODS SUPERFAMILY ATLANTACEA

Small, pelagic gastropods usually with soft parts too large to be contained in the shell. Animals have large eyes and are active swimmers. Shells thin, translucent and variously shaped, disklike in the Atlantidae, cap-shaped in Carinariidae. Widely distributed in warm seas.



Péron's Sea Butterfly (0.4") 1 cm
Atlanta peroni Lesueur, 1817. Pelagic in warm areas of Indo-Pacific and Atlantic waters; common.



Glassy Nautilus (3.2") 8 cm
Carinaria cristata (L., 1767). Pelagic in warm S.W. Pacific. Rare. Syn.: *vitrea* Gmelin; *japonica* Okutani.



Lamarck's Nautilus (3") 7.5 cm
Carinaria lamarcki Péron & Lesueur, 1810. Worldwide warm seas. Syn.: *fragilis* E. A. Smith; *challengeri* Bonnevie, 1920.

MOON SHELLS FAMILY NATICIDAE

Large worldwide family of small or moderate-size shells, globular or flattened in shape, smooth and glossy. Umbilicus open or closed, sometimes with an internal rib. Operculum thick and calcareous or thin and corneous. Carnivorous sand dwellers which lay eggs in a "collar" of sand and mucus.



Wavy Moon (2") 5 cm
Globularia fluctuata (Sowerby, 1825). Philippines; North Borneo. Offshore; uncommon. Syn.: *imperfata* Jay.



Hackett's Moon (1") 2.5 cm
Polinices hacketti Marinovich, 1975. Galapagos Islands (endemic). In sand, offshore, 50 to 60 m; rare.



Powell's Moon (1") 2.5 cm
Polinices tawhitirahia Powell, 1964. New Zealand; Norfolk Island. Offshore, 30 to 40 m; rare.



Stone-wall Moon (0.75") 2 cm
Polinices putealis Garrard, 1961. New South Wales, Australia. Deep water; moderately rare.



Pear-shaped Moon (1.5") 4 cm
Polinices tumidus (Swainson, 1840). Indo-Pacific. Shallow offshore waters; common. Syn.: *pyriformis* Récluz.



Conical Moon (1") 2.5 cm
Polinices conicus (Lamarck, 1822). Australia; New Zealand (rare). Intertidal to offshore; moderately common. Syn.: *pyramis* Reeve.



Common Australian Moon (1.5") 4 cm
Polinices sordidus (Swainson, 1821). Australia. In sand, intertidal to shallow offshore waters; common. Syn.: *plumbea* Lamarck; *strangei* Reeve.



Egg-white Moon (2") 5 cm
Neverita albumen (L., 1758). Indo-Pacific. In clean sand to 70 m; uncommon. Very flattened shell.



Shark-eye Moon (3") 7.5 cm
Neverita duplicata (Say, 1822). Massachusetts to S.E. United States. Sand flats, shallow water; common. Syn.: *campeachiensis* Reeve.



Ince's Moon (1") 2.5 cm
Neverita incei (Philippi, 1853). Australia. In sand, shallow water; uncommon. Syn.: *fibula* Reeve; *baconi* Reeve.



Josephine's Moon (1.25") 3 cm
Neverita josephinia Risso, 1826. Mediterranean; W. Europe. Offshore to 15 m; common. Syn.: *olla* Serres; *philippiana* Reeve.



Elephant's-foot Moon (1.5") 4 cm
Neverita peselephanti (Link, 1807). Indo-Pacific. In sand to 10 m; moderately common. Syn.: *powisiana* Récluz; *columnaris* Récluz.



Sagami Bay Moon (1.5") 4 cm
Neverita sagamiensis (Pilsbry, 1904). Japan. In sand, offshore, 10 to 40 m; uncommon.



Adorned Moon (1.25") 3 cm
Neverita vestita Kuroda, 1961. Japan (endemic). In sand, offshore, to 50 m; uncommon.



Bladder Moon (2.5") 6 cm
Polinices didyma (Röding, 1798). Western Pacific; Indian Ocean. Intertidal to 100 m; common. Syn.: *bicolor* Philippi; *vesicalis* Philippi.



Drake's Moon (2.5") 6 cm
Neverita draconis (Dall, 1903). Alaska to northern Mexico. Offshore, 20 to 50 m; uncommon.



Two-band Moon (1.6") 4 cm
Polinices bifasciatus (Griffith & Pidgeon, 1834). Gulf of California to Panama. Intertidal mud flats; common.



Guillemin's Moon (1") 2.5 cm
Euspira guillemini (Payraudeau, 1826). Mediterranean and north to Brittany. Offshore in shallow water; uncommon.



Common Northern Moon (3.5") 9 cm
Lunatia heros (Say, 1822.) Gulf of St. Lawrence to North Carolina. In sand, intertidal to offshore; common.



Lewis's Moon (4") 10 cm
Lunatia lewisi (Gould, 1847). British Columbia to Baja California. In sand, intertidal and offshore; common. Largest living naticid.



Poli's Necklace Shell (0.5") 1.2 cm
Euspira poliana (Chiaje, 1826). N.W. Europe; Mediterranean. In sand, intertidal and offshore; common. Syn.: *alderi* Forbes; *pulchella* Forbes.



Yokoyama's Moon (0.5") 1.2 cm
Euspira yokoyamai Kuroda & Habe, 1961. Japan (endemic). Offshore, 70 to 100 m; uncommon. Syn.: *pallida* Yokoyama.



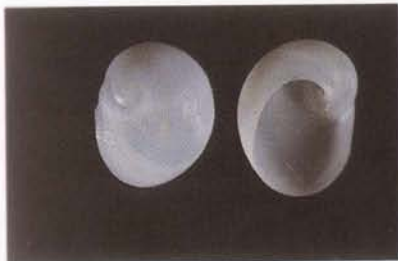
Umbilicate Moon (1") 2.5 cm
Sigaretotrema umbilicata (Quoy & Gaimard, 1833). South half of Australia. In sand, intertidal and offshore; uncommon. Syn.: *picta* Reeve.



Concave Ear Moon (1.3") 3 cm
Sinum concavum (Lamarck, 1822). West Africa. Trawled offshore in fairly deep water; uncommon.



Boat Ear Moon (2") 5 cm
Sinum cymba (Menke, 1828). Ecuador to Chile; Galapagos Islands. Shallow water; moderately common. Brown aperture.



Baby's Ear Moon (1.5") 4 cm
Sinum perspectivum (Say, 1831). S.E. United States and West Indies; Bermuda. Shallow water, sand flats; common.



Spotted Ear Moon (1.2") 3 cm
Sinum maculatum (Say, 1831). North Carolina to Florida; Caribbean. In shallow water; uncommon. Syn.: *martinianum* Philippi probably.



Japanese Ear Moon (1.7") 4.5 cm
Sinum javanicum (Griffith & Pidgeon, 1834). Japan south to Indonesia. Offshore to 60 m; uncommon. Protoconch is purple-brown.



Neritelike Ear Shell (0.7") 1.8 cm
Sinum neritoideum (L., 1758). Bay of Bengal; Malaysia; Indonesia. Intertidal and offshore; moderately common.



Oldroyd's Fragile Moon (3") 7 cm
Calinaticina oldroydii (Dall, 1897). Oregon to southern California. Sand bottom; 60 to 140 m; common.



Black-mouth Moon (2") 5 cm
Polinices melanostomus (Gmelin, 1791). Indo-Pacific. Shallow water; common. Syn.: *opaca* Récluz; *succineoides* Reeve.



Seba's Moon (1.5") 3 cm
Polinices sebae (Récluz, 1844). Indo-Pacific. Shallow water; common. May be form of *mammata*.



Mikawa Moon (2") 5 cm
Polinices mikawaensis Azuma, 1961. Western Pacific. Shallow water; uncommon.



Maurus Moon (2") 5 cm
Polinices maurus (Lamarck, 1816). Indo-Pacific. Shallow sand flats; common. Syn.: *nuxcastanea* Hedley.



Breast-shaped Moon (1.5") 3 cm
Polinices mammatus (Röding, 1798). Western Pacific; Japan. In sand, offshore, 10 to 50 m; moderately common.



Brown Moon (1.5") 4 cm
Polinices hepaticus (Röding, 1798). Florida to Brazil. Shallow water, sand; uncommon. Syn.: *brunneus* Link.



Swainson's Moon (1.2") 3 cm
Polinices melastomus (Swainson, 1821). Southwestern Pacific. Shallow water, sand. Uncommon. Syn.: *sanguinolenta* Deshayes.



Senegal Moon (1") 2.5 cm
Polinices grossularius Marche-Marchad, 1957. N.W. Africa to Angola; Mediterranean. In sand offshore, 30 to 130 m; moderately rare.



Plicispira Moon (1") 2.5 cm
Polinices plicispirus Kuroda, 1961. Japan. Offshore; uncommon.



Papilla Moon (1") 2.5 cm
Eunaticina papilla (Gmelin, 1791). Melanesia to Indian Ocean. Shallow water in sand; uncommon.



Golden Moon (1.7") 4.5 cm
Polinices aurantius (Röding, 1798). Western and central Pacific. Clean sand to 20 m; moderately common. Syn.: *mellosum* Hedley; *straminea* Récluz.



Fleming's Moon (1.5") 4 cm
Polinices flemingianus (Récluz, 1844). Japan to Australia and Fiji. Clean sand, intertidal and shallow water; moderately common. Syn.: *jukesii* Reeve.



Récluz's Moon (2.5") 6 cm
Polinices reclusiana (Deshayes, 1839). Northern California to W. Mexico. Intertidal and offshore; common. Syn.: *imperfurata* Dall.



Spiral Moon (2") 5 cm
Neverita helicoides (Gray, 1825). Baja California to Peru. Intertidal and offshore; moderately common. Syn.: *glauca* Lesson.



Caribbean Milk Moon (1") 2.5 cm
Polinices lacteus (Guilding, 1834). S.E. United States to Brazil; Bermuda. Shallow water; common.



Panama Milk Moon (1.6") 4 cm
Polinices panamaensis (Récluz, 1844). Panama to northern Peru. Offshore to 45 m; uncommon.



Purplish Alaskan Moon (0.7") 1.8 cm
Amauropsis purpureus Dall, 1871. Alaska. Offshore; common. Holotype illustrated.



Iceland Moon (1") 2.5 cm
Bulbus islandicus (Gmelin, 1791). Arctic seas south to Virginia; northern Europe. Offshore; moderately common. Syn.: *helicoides* Johnston.



European Gray Moon (0.7") 1.8 cm
Payraudeautia intricata (Donovan, 1804). Mediterranean; Europe; Azores. In sand in shallow water; moderately common. Syn.: *valenciennesi* Payraudeau.



Carolina Moon (0.5") 1.2 cm
Sigatica carolinensis (Dall, 1889). North Carolina south to Caribbean. In sand offshore to 180 m; uncommon.



European Necklace Shell (1.5") 4 cm
Polinices catena (da Costa, 1778). N. W. Europe; Mediterranean. In sand, shallow water; common. Syn.: *monilifera* Lamarck; *ampullifera* Lamarck.



Dark-brown Necklace Shell (1") 2.5 cm
Polinices fuscus (Blainville, 1825). N. W. Europe; Mediterranean. Offshore to 30 m; uncommon. Syn.: *sordida* Philippi.



Solid Moon (1") 2.5 cm
Natica fasciata (Röding, 1798). Southwest Pacific. Shallow water in sand. Syn.: *solida* Blainville.



Calf Moon (1.5") 4 cm
Natica vitellus (L., 1758). Western Pacific; Indian Ocean. Shallow water; common. Syn.: *rufa* Born; *spadicea* Gmelin; *helvacea* Lamarck.



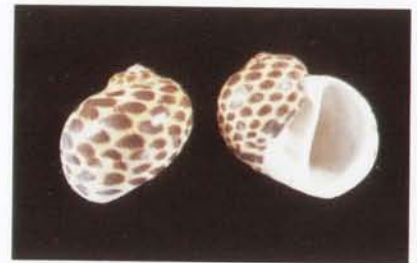
Lined Moon (1.5") 4 cm
Natica lineata (Röding, 1798). Japan to Queensland; northern Indian Ocean. Sand or mud to 50 m; common. Red lines straight. Syn.: *lineata* Lamarck.



Starry Moon (1.5") 4 cm
Natica stellata Chenu, 1845. Western Pacific, possibly Indian Ocean. In sand to 20 m; moderately common. The "vitellus" of authors.



Traill's Moon (0.75") 2 cm
Natica traillii Reeve, 1855. Indian Ocean; Malaysia. Shallow water; uncommon. Syn.: possibly *buriasiensis* Récluz.



African Berry Moon (1") 2.5 cm
Natica acinonyx Marche-Marchad, 1957. Senegal and Gambia. Offshore, 20 to 220 m; rare.



Adanson's Moon (1") 2.5 cm
Natica adansoni Blainville, 1825. Western Africa. Fairly shallow water; uncommon. Syn.: *variabilis* Reeve.



Collared Moon (1") 2.5 cm
Natica collaria Lamarck, 1822. Western Africa. In sand, shallow water; moderately common. Syn.: *labrella* Lamarck; *gambiae* Récluz.



The Fanel Moon (1") 2.5 cm
Natica fanel (Röding, 1798). Western Africa. In sand, shallow water; moderately common. Syn.: *rocquignyi* Fischer-Piette.



Lightning Moon (1.2") 3 cm
Natica fulminea (Gmelin, 1791). Western Africa. Shallow water; moderately common. Syn.: *cruentata* Gmelin; *punctata* Swainson.



Ribbioned Moon (0.5") 1.2 cm
Natica lemniscata Philippi, 1851. Japan and Okinawa. Fairly deep water; moderately rare.



Brown-lined Moon (1.5") 4 cm
Natica brunneolinea McLean, 1970. Galapagos Islands (endemic). Deep water; rare.



Moroccan Moon (0.7") 1.8 cm
Natica marochiensis (Gmelin, 1791). Florida; West Indies to Brazil; eastern Africa. Intertidal; moderately common. Syn.: *maroccana* Dillwyn.



Gualtieri's Moon (0.75") 2 cm
Natica gualteriana Récluz, 1844. Indo-Pacific. Intertidal to fairly deep water; common. Syn.: *tessellata* Philippi; *antonii* Philippi.



Lavender Moon (3.8") 1 cm
Natica lavendula Woolacott, 1956. Northern Australia to Fiji. Clean sand, shallow water; uncommon. Syn.: possibly *pseustes* Watson.



Violet-mouthed Moon (1.5") 4 cm
Natica janthostomoides Kuroda & Habe, 1949. Japan (endemic). Muddy sand, 20 to 40 m; uncommon. One or two ribs on operculum.



Nebulose Moon (0.6") 1.5 cm
Natica nebulosa Schepman, 1910. Indonesia. Offshore; rare. Holotype illustrated.



Broad-striped Moon (1") 2.3 cm
Natica inexpectans Olsson, 1971. Gulf of Panama. Offshore, 120 m; rare. Has broader stripes. Holotype illustrated.



Scethra Moon (0.6") 1.5 cm
Natica scethra Dall, 1908. Mexico to northern Peru; Baja California. Deep water; moderately rare.



Single-banded Moon (1.2") 3 cm
Natica unifasciata Lamarck, 1822. Costa Rica to northern Peru. Intertidal and shallow offshore waters; common.



Colorful Atlantic Moon (2") 5 cm
Natica canrena (L., 1758). S. E. United States; Caribbean; Bermuda. Offshore to 60 m; common. Syn.: *verae* Rehder.



China Moon (1") 2.5 cm
Natica onca (Röding, 1798). Indo-Pacific. In sand, intertidal to shallow offshore waters; common. Syn.: *pavimentum* Röding; *chinensis* Lamarck.



Hebrew Moon (2") 5 cm
Natica maculata (von Salis, 1793). Mediterranean; W. Europe. Sand and gravel to 100 m; moderately common. Syn.: *adspersa* Menke.



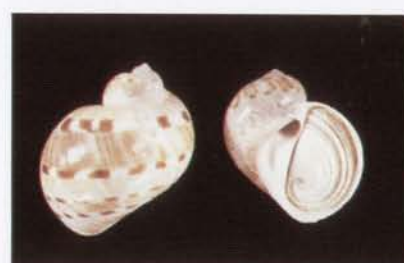
Seychelles Moon (0.7") 1.8 cm
Natica sertata Menke, 1843. Northern half of Australia; Indian Ocean. Intertidal to deep water; uncommon. Syn.: *colliei* Récluz.



Florida Moon (1") 2 cm
Natica floridana (Rehder, 1943). Southeastern Florida to Brazil. Offshore to 20 m; uncommon. Operculum with 4 ribs.



Cayenne Moon (1") 2.5 cm
Natica cayennensis Récluz, 1850. West Indies to Brazil. In sand in shallow water; moderately common. Syn.: *haysae* Nowell-Usticke.



Turton's Moon (1.5") 4 cm
Natica turtoni E. A. Smith, 1890. Western Africa; St. Helena. In sand to 50 m; moderately common.



Four-banded Moon (0.75") 2 cm
Natica idiopoma Pilsbry & Lowe, 1932. Western Mexico to Panama; Galapagos Islands. Offshore to moderate depths; uncommon.



New Zealand Moon (1") 2.5 cm
Natica zelandica Quoy & Gaimard, 1832. New Zealand (endemic). Intertidal and shallow water offshore; moderately common.



Beautifully-banded Moon (0.8") 2 cm
Natica euzona (Récluz, 1844). Indo-Pacific. In sand, offshore to 60 m; uncommon. Syn.: *decora* Philippi; *cothurnata* Iredale.



Zebra Moon (1") 2.5 cm
Natica undulata (Röding, 1798). Japan; Philippines and possibly Indian Ocean. In sand to 40 m; uncommon. Syn.: *zebra* Lamarck.



Tabulated Moon (0.75") 2 cm
Natica tabularis Kuroda, 1961. Japan (endemic). In fine sand, 50 to 100 m; rare.



Arctic Moon (1.2") 3 cm
Natica clausa Broderip & Sowerby, 1829. Arctic seas of North America. Common. Syn.: *aleutica* Dall (holotype illustrated) and others.



Flamed Moon (5.8") 14 cm
Natica filosa Philippi, 1845. Mediterranean; W. Europe; N. W. Africa. Offshore, 10 to 20 m; uncommon. Syn.: *flamulata* Requier.



Occluded Moon (1") 2.5 cm
Natica tecta Anton, 1839. South Africa. Sand or mud, intertidal to 20 m; moderately common. Syn.: *imperforata* Gray; *geuanus* Reeve.



Mexican Moon (1") 2.5 cm
Natica lunaris Berry, 1964. Sonora to Nayarit, western Mexico. Offshore, 7 to 45 m; rare.



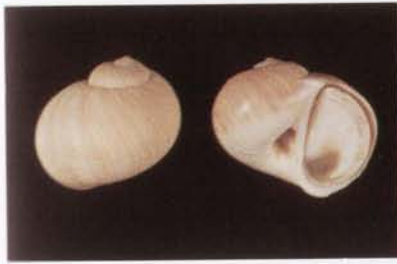
Sulcate Moon (0.8") 2 cm
Stigmaulax sulcatus (Born, 1778). South-eastern Florida to Brazil. Shallow water; uncommon. Syn.: *cancellatus* Gmelin.



Broderip's Moon (1") 2.5 cm
Stigmaulax broderipiana Récluz, 1844. W. Mexico to Peru. Offshore to 55 m; common. Syn.: *iostoma* Menke.



Spider Moon (1") 2.5 cm
Natica arachnoidea (Gmelin, 1791). Indo-Pacific. Shallow water to 3 m; moderately common. Syn.: *raynoldiana* Récluz.



White-bottom Moon (0.7") 1.8 cm
Natica lacteobasis Kuroda, 1961. Japan. Offshore; uncommon.



Violet Moon (0.7") 1.8 cm
Natica violacea Sowerby, 1825. Indo-Pacific. Shallow water to 20 m; uncommon. Syn.: *rhodostoma* Philippi.



Canelo Moon (1") 2.5 cm
Natica caneloensis Hertlein & Strong, 1955. W. Mexico to Ecuador. Shallow water, sand; uncommon.



Butterfly Moon (1.2") 3 cm
Natica alapapilionis (Röding, 1798). Indo-Pacific. Shallow water, sand. Uncommon. Syn.: *zonaria* Lamarck; *plicifera* Philippi; *taeniata* Menke.



Fly-specked Moon (1.5") 4 cm
Natica stercusmuscarum (Gmelin, 1791). Mediterranean; N. W. Africa. Offshore to 10 m; common. Syn.: *millepunctata* Lamarck.



Bordered Moon (0.7") 1.8 cm
Natica limbata Orbigny, 1840. Southern Brazil to Argentina. Muddy sand, 18 to 72 m; common. Syn.: *isabelleana* Orbigny.



Cheerful Moon (1") 2.5 cm
Natica hilaris Sowerby, 1914. Japan to South Africa. Fine sandy bottom, 20 to 200 m; locally common. Syn.: *luculenta* Iredale.



Tosa Moon (1") 2.5 cm
Natica tosaensis Kuroda, 1961. Off Tosa, Japan. Dredged in deep water; uncommon.



Tiger Moon (1") 2.5 cm
Natica tigrina (Röding, 1798). Eastern Asia. Offshore, 10 to 30 m; common. Syn.: *maculosa* Lamarck; *pellistigrina* Deshayes.

HELMET SHELLS FAMILY CASSIDAE

Helmet shells live mostly in warm waters around the world. Shells of males may differ from those of females. Interspecific hybridization may take place and deep-water forms are particularly puzzling. Some species spawn towerlike egg masses and free-swimming larval stages. Food consists primarily of sea urchins. Operculum chitinous, small, elongate in *Cassid*, fan-shaped in *Phalium*.



Horned Helmet (8.5") 22 cm
Cassis cornuta (L., 1758). Indo-Pacific. Associated with coral reefs; common. 1 to 20 m.



Horned Helmet (8.5") 22 cm
Cassis cornuta (L., 1758). Like several other helmet shells, the male of the species (left) is smaller than the female.



Horned Helmet (3") 7.5 cm
Cassis cornuta (L., 1758). Juvenile shells lack the 7 or 8 varices of adults. Shoulder knobs small, numerous.



King Helmet (6") 15 cm
Cassis tuberosa (L., 1758). Brazil; Bermuda; North Carolina to Caribbean. Shallow water; common. 7 or 8 brown spots on each varix.



Emperor Helmet (6.5") 16.5 cm
Cassis madagascariensis Lamarck, 1822. Florida to Lesser Antilles; Bahamas. In sand, moderately shallow water; common.



Emperor Helmet (6.5") 16.5 cm
Cassis madagascariensis Lamarck, 1822. West Indian specimens were used to make large cameos.



Clench's Helmet (12") 30 cm
Cassis madagascariensis form *spinella* Clench, 1944. S. E. United States. 5 to 30 m; locally common. Largest *Cassid*.



Flame Helmet (4.3") 11 cm
Cassis flammea (L., 1758). Bermuda; Florida to Lesser Antilles. Shallow water; common. No brown between teeth.



Fimbriate Helmet (3") 7.5 cm
Cassis fimbriata Quoy & Gaimard, 1833. Western Australia to western Victoria. Intertidal to 200 m; common.



Dwarf Helmet (1.5") 4 cm
Cassis nana Tenison-Woods, 1879. Eastern Australia. On sand, 60 to 240 m; moderately common. Smallest living *Cassid*.



West African Helmet (8") 20 cm
Cassis tessellata (Gmelin, 1791). Southern West Africa. On sand to 60 m; uncommon. Syn.: *spinosa* Gronovius.



Reticulated Cowrie-helmet (2.5") 6.5 cm
Cypraea testiculus testiculus (L., 1758). Southeastern Florida to Brazil. Shallow water; common. Form *crumena* Bruguière at right.



Senegal Cowrie-helmet (2.5") 6.5 cm
Cypraea testiculus senegalica (Gmelin, 1791). Western Africa and offshore islands. Shallow water; common.



Bullmouth Helmet (6") 15 cm
Cypraea rufa (L., 1758). Indo-Pacific (not India or Hawaii). Near coral reefs; common (rarer in center of range).



Bullmouth Helmet (6") 15 cm
Cypraea rufa (L., 1758). Shipped annually from eastern Africa to Italy for use in the manufacture of cameos.



Galapagos Cowrie-helmet (4.5") 11.5 cm
Cypraea tenuis (Wood, 1828). Baja California to Ecuador; Galapagos. Offshore, sometimes beached; uncommon.



Contracted Cowrie-helmet (2.5") 6.5 cm
Cypraea coarctata (Sowerby, 1825). Gulf of California to Peru. Intertidal and offshore; uncommon.



Gray Bonnet (3.5") 9 cm
Phalium glaucum (L., 1758). Indo-Pacific. Intertidal and offshore, on sand; common. 3 or 4 strong spines at base of outer lip.



Banded Bonnet (3.5") 9 cm
Phalium bandatum bandatum (Perry, 1811). Western Pacific, especially northern Australia. Shallow to deep water; common.



Furrowed Bonnet (3.5") 9 cm
Phalium bandatum exaratum (Reeve, 1848). Mascarene Islands, Indian Ocean. Offshore; rare. Deep spiral grooves.



Checkerboard Bonnet (2.5") 6.5 cm
Phalium areola (L., 1758). Eastern Africa to Melanesia and Samoa. Intertidal and offshore on sandy mud; common. Spots vary.



Striped Bonnet (3.5") 9 cm
Phalium flammiferum (Röding, 1798). Japan; Taiwan; eastern China. Offshore to 100 m; common. Syn.: *strigatum* Gmelin. Not *strigatum* Müller, 1776.



Decussate Bonnet (2.5") 6.5 cm
Phalium decussatum (L., 1758). Southeastern Asia; southern Japan. Offshore; common. Rarely striped.



Fimbriate Bonnet (3") 7.5 cm
Phalium fimbria (Gmelin, 1791). Indian Ocean and Indonesia. Offshore, occasionally beached; rare. Syn.: *plicaria* Lamarck.



Pilsbry's Bonnet (2.5") 6.5 cm
Phalium pilsbryi (Woodring & Olsson, 1957). Galapagos. Shallow water; rare. Resembles *P. wyvillei*.



Wyville's Bonnet (4") 10 cm
Phalium coronadoi wyvillei (Watson, 1886). Japan to Australia. Deep water; rare. Holotype illustrated.



(left) **Chalky Bonnet** (2.5") 6.5 cm
Phalium carnosum (Kuroda & Habe, 1961).
(right) **Kuroda's Bonnet** (2.5") 6.5 cm
Phalium kurodai Abbott, 1968. Both Japan. Deep water; rare.



Japanese Bonnet (2.3") 6 cm
Phalium bisulcatum (Schubert & Wagner, 1829). Indo-Pacific. Offshore to deep water; common. Syntypes illustrated.



Sophia's Bonnet (3") 7.5 cm
Phalium bisulcatum sophia (Brazier, 1872). Eastern Australia; Kermadec Islands. Offshore, 80 to 160 m; uncommon.



Japanese Bonnet (2.3") 6 cm
Phalium bisulcatum (Schubert & Wagner, 1829). One of the many synonyms is *japonica* Reeve (holotype illustrated).



Faurot's Bonnet (2") 5 cm
Phalium fauroti (Jousseaume, 1888). Western Indian Ocean. Offshore to deep water; uncommon. Apex purple.



Channeled Bonnet (1.8") 4.5 cm
Phalium canaliculatum (Bruguière, 1792). Bay of Bengal. Offshore; common. Has a subsutural channel.



Hawaiian Bonnet (2.2") 5.5 cm
Phalium umbilicatum (Pease, 1860). Hawaiian Islands. Offshore to deep water; rare. Syn.: *fortisulcata* E. A. Smith. Paratype illustrated.



Narrow-mouthed Bonnet (2.2") 5.5 cm
Phalium microstoma (von Martens, 1903). Off Tanganyika to Somalia. Deep water; rare.



Smooth Bonnet (2") 5 cm
Phalium glabratum glabratum (Dunker, 1852). Philippines; Indonesia; New Guinea. Offshore to deep water; rare.



Bubble Bonnet (1.8") 4.5 cm
Phalium glabratum bulla (Habe, 1961). Southern Japan; southeast China; Hawaii. 50 to 200 m; moderately common.



Half-grained Bonnet (2") 5 cm
Phalium semigranosum (Lamarck, 1822). Southern Australia; Tasmania. On sand offshore to deep water; common.



Adcock's Bonnet (1.2") 3 cm
Phalium adcocki (Sowerby, 1896). Southern Australia. Offshore to 200 m; rare. Few specimens in private hands.



Saburon Bonnet (2") 5 cm
Phalium saburon (Bruguière, 1792). Mediterranean; Bay of Biscay to Ghana. Offshore; common. Syn.: *ponum* Schubert & Wagner.



South African Bonnet (2.5") 6.5 cm
Phalium craticulatum (Euthyme, 1885). Mozambique to South Africa. Deep water; uncommon. Syn.: *africana* Fulton.



Valdivia Bonnet (2") 5 cm
Phalium bituberculosum (von Martens, 1901). Eastern Africa. 100 to 1,079 m; rare. "Valdivia" dredged first known specimen.



Scotch Bonnet (3") 7.5 cm
Phalium granulatum granulatum (Born, 1778). S.E. United States to Brazil. Offshore; common. Some are smoothish.



Mediterranean Bonnet (3.5") 9 cm
Phalium granulatum subspecies *undulatum* (Gmelin, 1791). Mediterranean. Offshore; common. Syn.: *sulcosa* Bruguière.



Panamic Bonnet (2.3") 6 cm
Phalium granulatum subspecies *centiquadratum* (Valenciennes, 1832). W. Mexico to Peru; Galapagos. Offshore; common.



Pear Bonnet (2.5") 6.5 cm
Phalium pyrum pyrum (Lamarck, 1822). Southern Australia; Tasmania; New Zealand; South Africa. Offshore to deep water; common.



Roy Bell's Bonnet (4.5") 11.5 cm
Phalium pyrum royanum (Iredale, 1914). New South Wales; New Zealand; Kermadec Islands. Offshore, craypots; uncommon. Named after Roy Bell.



Few-wrinkled Bonnet (2") 5 cm
Phalium pauciruge (Menke, 1843). Southwestern Australia. 1 to 20 m; moderately common. Solid and heavy.



Thomson's Bonnet (2.5") 6.5 cm
Phalium thomsoni (Brazier, 1875). South-eastern Australia; northern New Zealand. Deep water; uncommon.



Whitworth's Bonnet (2.5") 6.5 cm
Phalium whitworthi Abbott, 1968. Western Australia. Offshore, craypots; moderately rare. Spiral cords strong.



Unadorned Bonnet (2.2") 5.5 cm
Phalium inornatum (Pilsbry, 1895). Central Japan to southern China Sea. Offshore to 30 m; moderately common.



Lipped Bonnet (2.5") 6.4 cm
Phalium labiatum labiatum (Perry, 1811). Victoria; southern Queensland; northern New Zealand. Offshore to about 100 m; common.



Iredale's Bonnet (2.5") 6.5 cm
Phalium labiatum subspecies *iredalei* (Bayer, 1935). South Africa. Offshore, often beached; common. Remarkably variable.



Ihering's Bonnet (2.5") 6.5 cm
Phalium labiatum subspecies *iheringi* (Carcelles, 1953). Northern Argentina; southern Brazil. Moderately deep water; uncommon.



Heavy Bonnet (1.5") 4 cm
Casmaria ponderosa ponderosa (Gmelin, 1791). Indo-Pacific. In sand, shallow water; common. Several named forms.



Atlantic Bonnet (1") 2.5 cm
Casmaria ponderosa atlantica Clench, 1944. Southeastern Florida; Caribbean. Offshore to 50 m; rare.



Vibex Bonnet (2") 5 cm
Casmaria erinaceus (L., 1758). Indo-Pacific. Shallow water; locally common. Syn.: *vi-bex* L.



Spiny Bonnet (2.5") 6.5 cm
Galeodea echinophora (L., 1758). Mediterranean. Offshore to deep water; uncommon. Syn.: *tuberculosa* Schumacher.



Rugose Bonnet (2.5") 6.5 cm
Galeodea rugosa (L., 1758). Mediterranean; western Europe. Offshore to deep water; common. Syn.: *tyrrhena* Gmelin.



Royal Bonnet (2") 5 cm
Sconsia striata (Lamarck, 1816). S.E. Florida to off Texas to Brazil. Deep water; uncommon. Syn.: *grayi* A. Adams; *barbudensis* Higgins & Marrat.



Nephele Bonnet (1.5") 3.78 cm
Sconsia nephele Bayer, 1971.
Off Grenada, Lesser Antilles. 18
m; rare. Holotype illustrated.



Alcock's False Tun (2") 5 cm
Oocorys alcocki (E. A. Smith,
1906). Bay of Bengal and Indo-
nesia. Deep water; rare.



Alabaster False Tun (2.3") 6 cm
Galeocorys leucodoma (Dall,
1907). Japan. Deep water; rare.



Atlantic Morum (0.8") 2 cm
Morum oniscus (L., 1767). S.E.
Florida to Brazil; Bermuda. Un-
der coral slabs, low tide; com-
mon. Syn.: *purpureum* Röding.



Heavy Morum (1.5") 4 cm
Morum ponderosum (Hanley,
1858). Southwestern Pacific to
Pitcairn Island. On reefs; un-
common. Lectotype illustrated.



Dennison's Morum (2") 5 cm
Morum dennisoni (Reeve,
1842). Caribbean. Deep water,
150 to 260 m; rare.



Velero Morum (1.5") 4 cm
Morum veleroae Emerson,
1968. Off Cocos Island (Costa
Rica); Galapagos. Dredged, 50
to 100 m; rare.



Matthews's Morum (1") 2.5 cm
Morum matthewsi Emerson,
1967. Off Ceara, Brazil. From
fish stomachs, 30 m; rare.



Kurz's Morum (1") 2.5 cm
Morum kurzii Petuch, 1979.
Central Philippines. 250 m;
rare. Type illustrated.



Noble Morum (1.5") 4 cm
Morum praeclarum Melvill,
1919. Western Indian Ocean.
Dredged, deep water; rare.
Holotype illustrated.



MacAndrew's Morum (1.5")
4 cm *Morum macandrewi* (So-
werby, 1889). East Asia. Off-
shore, to 100 m; uncommon.
Holotype illus.



Lumpy Morum (0.6") 1.5 cm
Morum tuberculatum (Reeve,
1842). Baja California to Peru.
Intertidal; uncommon. Type il-
lustrated.



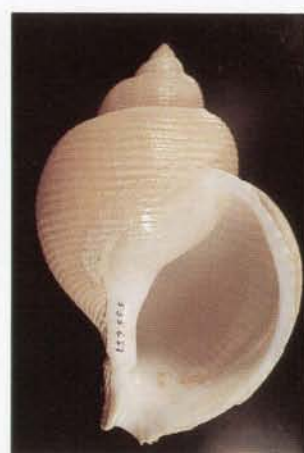
Giant Morum (2.5") 6.5 cm
Morum grande (A. Adams, 1855). Japan to Queensland, Australia. Trawled, deep water; moderately rare.



Cancellate Morum (1.8") 4.5 cm
Morum cancellatum (Sowerby, 1824). China Sea. Dredged, 50 to 150 m; uncommon.



Watson's Morum (1.5") 4 cm
Morum watsoni Dance & Emerson, 1967. Western Pacific. Rare. Syn.: *cithara* Watson. (Holotype illus.)



Bartsch's False Tun (4") 10 cm
Oocorys bartschi Rehder, 1943. Gulf of Mexico; southeast Florida. Deep water; uncommon. Holotype illus.



Lineated False Tun (2") 4 cm
Oocorys lineata (Schepman, 1909). Ceram Sea, Indonesia; eastern Asia. Deep water; rare.



Barbour's False Tun (2") 5 cm
Oocorys barbouri Clench & Aguayo, 1939. Off northern Cuba. Deep water; rare. Holotype illus.



Sulcate False Tun (2") 5 cm
Oocorys sulcata Fischer, 1883. Caribbean; N.W. Africa; Indian Ocean. Deep water; uncommon. Syn.: *indica* E. A. Smith.



Caribbean False Tun (1.5") 4 cm
Oocorys caribbaea Clench & Aguayo, 1939. North coast of Cuba. Deep water; rare. Holotype illus.



Solid Dalium (2") 5 cm
Dalium solidum Dall, 1889. Southern Caribbean; Surinam. 600 to 2,000 m; rare. Considerable size variation.



Pyriform False Tun (2") 5 cm
Eudolium pyriforme (Sowerby, 1914). Japan to S.E. Asia. Off-shore; common.

FIG SHELLS FAMILY FICIDAE

Small family of moderately large to small shells, characteristically fig- or pear-shaped and light in structure. Sand dwellers in warm-water areas, they lack an operculum. Animal's large foot has two flaps, one on each side of the anterior (siphonal) end. Shells of males may differ from those of females.



Swollen Fig Shell (3.5") 9 cm
Ficus ventricosa (Sowerby, 1825). Western Mexico to Peru. Offshore, sometimes beached; common.



Graceful Fig Shell (5") 13 cm
Ficus gracilis (Sowerby, 1825). Eastern Asia. Offshore to 100 m. Locally common. Syn.: *dussumieri* Chenu.



Underlined Fig Shell (4") 10 cm
Ficus subintermedia (Orbigny, 1852). Indo-Pacific. Offshore, in sandy mud; common.



True Fig Shell (3") 7.5 cm
Ficus variegata Röding, 1798. Eastern Asia; Japan. 1 to 20 m; uncommon. Linné's *ficus* is unidentifiable.



Carol's Fig Shell (2.5") 6 cm
Ficus carolae Clench, 1945. Gulf of Mexico from southeastern Florida to Mexico. Deep water; rare. Holotype illus.



Common Fig Shell (3.5") 9 cm
Ficus communis Röding, 1798. North Carolina to Gulf of Mexico. Offshore, often beached; common. Syn.: *papyratia* Say.



Threaded Fig Shell (3") 7.5 cm
Ficus filosa (Sowerby, 1892). Japan; China Sea, eastern Australia. Deep water; uncommon. Holotype illus.



Spotted Fig Shell (2") 5 cm
Ficus eospila (Péron-Lesueur, 1807). Western Australia. Offshore; common. Syn.: *tesselata* Kobelt.



Howell's Fig Shell (1.5") 4 cm
Ficus howelli Clench & Farfante, 1940. Cuba to Trinidad. Deep water; rare.



Atlantic Fig Shell (1.5") 4 cm
Ficus atlanticus Clench & Aguayo, 1940. Off Bahia, Brazil. Deep water; rare. *F. howelli*, may be male form.



Bengal Fig Shell (3") 7.5 cm
Ficus investigatoris E. A. Smith, 1906. Indian Ocean. Deep water; rare. Syn.: *sewelli* Prashad.

TUN SHELLS FAMILY TONNIDAE

Tun shells are thinner and usually roomier than helmet shells. They are almost exclusively tropical, prefer deeper water, and feed mainly on fish, sea urchins and crustaceans. Their free-swimming larval life is lengthy and has helped some species to spread great distances. The identification of some tun shells is not easy and synonyms abound.



Grinning Tun (7") 18 cm
Malea ringens (Swainson, 1822). W. Mexico to Peru. Under rock ledges and on sand bars; common.



Pacific Grinning Tun (2.5") 6.5 cm
Malea pomum (L., 1758). Indo-Pacific. Offshore; moderately common. Syn.: *labrosa* Gray.



Pacific Partridge Tun (4.5") 11.5 cm
Tonna perdis (L., 1758). Indo-Pacific. Offshore, in sand. Moderately common.



Atlantic Partridge Tun (3.5") 9 cm
Tonna maculosa (Dillwyn, 1817). S. E. Florida to Brazil. Offshore; moderately common.



Spotted Tun (4") 10 cm
Tonna dolium (L., 1758). Indo-Pacific; New Zealand. Offshore; uncommon. Ribs vary in number.



Costate Tun (3.5") 9 cm
Tonna allium (Dillwyn, 1817). Indo-W. Pacific. Offshore; moderately common. Syn.: *costatum* Menke.



Banded Tun (4") 10 cm
Tonna sulcosa (Born, 1778). Indo-Pacific. Offshore; uncommon. Syn.: *fasciatum* Brugière.



Channeled Tun (4") 10 cm
Tonna cepa (Röding, 1798). Indo-Pacific. Intertidal; common. *T. canaliculata* L. may be this species.



Giant Tun (6") 15 cm
Tonna galea (L., 1758). Caribbean; Atlantic; Mediterranean; Indo-Pacific. Offshore to 40 m; uncommon.



Black-mouthed Tun (8") 20 cm
Tonna melanostoma (Jay, 1839). Central Pacific (Tonga) to New Zealand. Offshore; rare.



Gold-mouthed Tun (6.5") 16 cm
Tonna luteostoma (Küster, 1857). Western Pacific; New Zealand. Offshore to 200 m; uncommon.



Marginate Tun (4") 10 cm
Tonna marginata (Philippi, 1845). Japan to Indonesia. Offshore; uncommon. Syn.: *reevei* Hanley (holotype illus.).



China Tun (4.3") 11 cm
Tonna chinensis (Dillwyn, 1817). S. W. Pacific. Offshore; uncommon. Syn.: *magnificus* Sowerby (holotype illus.).



Noronha Tun (2.5") 6 cm
Malea pomum noronhensis
Kempf and Matthews, 1969. Islands off N.E. Brazil. Sand bottoms; uncommon.



Thompson's False Tun (2") 5 cm
Eudolium thompsoni McGinty, 1955. Florida Keys and Gulf of Mexico. Moderately deep water; uncommon.

TRITONS FAMILY CYMATIIDAE

Predominantly dwellers of tropical and warm waters, tritons include some of the world's largest living gastropods. Shells mostly thick and solid, often covered by a bristly periostracum. Operculum thick, chitinous. Egg capsules attached to rocks. As veliger larvae may be free swimming for up to 3 months, the wide distribution of some species is at least partially explained.



Trumpet Triton (13") 33 cm
Charonia tritonis (L., 1758). Indo-Pacific. Coral reefs in shallow water; moderately common.



Atlantic Trumpet Triton (10") 25 cm
Charonia variegata (Lamarck, 1816). S.E. Florida; West Indies; Mediterranean. Moderately common. 1 to 15 meters.



Atlantic Trumpet Triton
Charonia variegata (Lamarck, 1816). Some specimens have heavy shoulder. May be orange. Syn.: *nobilis* Conrad.



Knobbed Triton (7") 18 cm
Charonia lampas (L., 1758). Mediterranean and adjacent coasts. Shallow water; moderately common.



Red Triton (6") 15 cm
Charonia rubicunda (Perry, 1811). S. half of Australia; Kermadec Islands; New Zealand. Shallow water; uncommon.



Powell's Triton (6") 15 cm
Charonia rubicunda form *powelli* Cotton, 1957. South Australia. On intertidal reefs; uncommon.



Wide-mouth Triton (8") 20 cm
Charonia lampas capax Finlay, 1926. New Zealand. Rocky ground; uncommon. May be same as *C. l. rubicunda* Perry.



Saul's Triton (6") 15 cm
Charonia sauliae (Reeve, 1844). Southern Japan. Offshore, 10 to 20 m; common.



Girdled Triton (2") 5 cm
Linatella cingulata (Lamarck, 1822). Western Atlantic; Indo-Pacific; South Africa. Offshore; uncommon.



Angular Triton (5") 13 cm
Cymatium femorale (L., 1758).
Southern Florida to Brazil. With
periostracum. Shallow water,
moderately common.



Angular Triton (5") 13 cm
Cymatium femorale (L., 1758).
Varies greatly in size and to a
lesser extent in color. Without
periostracum.



Tiger Triton (5") 13 cm
Cymatium tigrinum (Broderip,
1833). Gulf of California to Pan-
ama. Offshore to 20 m; moder-
ately rare.



Black-spotted Triton (3.5") 9 cm
Cymatium lotorium (L., 1758).
Tropical Indo-Pacific. Coral
reefs, shallow water; uncom-
mon.



Ranzani's Triton (6") 15 cm
Cymatium ranzanii (Bianconi,
1851). Mozambique; northern
Arabian Sea. Offshore; moder-
ately rare.



Perry's Triton (4") 10 cm
Cymatium perryi Emerson &
Old, 1963. Sri Lanka; southern
India. Offshore; uncommon.
No brown spots on columella.



Common Hairy Triton (3")
7.5 cm *Cymatium pileare* (L.,
1758). Indo-Pacific; western
Atlantic. Shallow water; com-
mon. Many synonyms.



Common Hairy Triton (3")
7.5 cm *Cymatium pileare* (L.,
1758). Specimen with periostra-
cum. In Atlantic, species ranges
from Bermuda to Brazil.



Aquatile Hairy Triton
(2.5") 6 cm
Cymatium pileare form *aqua-*
tile (Reeve, 1844). Under coral
slabs in the Indo-Pacific region.



Intermediate Hairy Triton
(2.5") 6 cm
Cymatium pileare form *inter-*
medium (Pease, 1869). This Pa-
cific form is moderately com-
mon in Hawaii.



Jeweled Triton (1.2") 3 cm
Cymatium gemmatum (Reeve,
1844). Indo-Pacific; West In-
dies. Under coral, on sand,
shallow water; uncommon.



Nicobar Hairy Triton (2") 5 cm
Cymatium nicobaricum (Röd-
ing, 1798). Indo-Pacific; West
Indies. Shallow water; com-
mon. Syn.: *L. chlorostomum*.



Thersites Hairy Triton
(1.5") 3.5 cm
Cymatium thersites (Reeve, 1844). Indian Ocean. Shallow water; uncommon.



Dwarf Hairy Triton (1") 2.5 cm
Cymatium vespacum (Lamarck, 1822). North Carolina; Bermuda to Brazil. Shallow water; uncommon.



Dwarf Hairy Triton (1") 2.5 cm
Cymatium vespacum (Lamarck, 1822). A variable species, the form illustrated is *C. pharcidum* (Dall, 1889).



Krebs's Hairy Triton (2.5") 6 cm
Cymatium krebsii (Mösch, 1877). North Carolina to Florida; Caribbean. Offshore to 160 m; uncommon.



Coated Triton (2") 5 cm
Cymatium amictum Reeve, 1844, subspecies *amictoideum* Keen, 1971. W. Mexico to Panama. 30 to 100 m; uncommon.



Swollen Hairy Triton (1.5") 4 cm
Cymatium gibbosum (Broderip, 1833). W. Mexico to Peru; Galapagos. Intertidal; moderately common.



Swollen Hairy Triton (1.5") 4 cm
Cymatium gibbosum (Broderip, 1833). Without periostracum.



Adair Hairy Triton (1") 2.5 cm
C. gibbosum adairense (Dall, 1910). W. Mexico (lower). Subsp. *klenei* Sby., 1889, from S. Africa (upper). Common.



Shouldered Triton (2.5") 6.5 cm
Cymatium tabulatum (Menke, 1843). Indo-Pacific; New Zealand. Shore rocks; common. Syn.: *exaratum* Reeve.



West African Hairy Triton
(2") 5 cm
Cymatium tranquebaricum (Lamarck, 1816). Western Africa; Cape Verde Is. Uncommon.



Wide-lipped Triton (1.2") 3 cm
Cymatium labiosum (Wood, 1828). Indo-Pacific; West Indies. Shallow water; uncommon. Siphon long or short.



Wide-lipped Triton (1.2") 3 cm
Cymatium labiosum (Wood, 1828). Indo-Pacific; West Indies. Syn.: *rutulum* Menke; *loiroisi* Petit.



Tinted Triton (2.5") 6 cm
Cymatium moritinctum (Reeve, 1844). Indo-Pacific. Shallow water; uncommon.



Blunted Triton (2") 5 cm
Cymatium retusum Lamarck, 1822. Indian Ocean; southeastern Asia. Shallow water; uncommon.



Tripus Triton (2.5") 6.5 cm
Cymatium tripus (Gmelin, 1791). Indian Ocean; southeastern Asia. Shallow coral waters; uncommon.



Bent-neck Triton (2.4") 6 cm
Cymatium caudatum (Gmelin, 1791). Indo-Pacific. On sand and coral, shallow water; uncommon.



Kii Triton (2") 5 cm
Cymatium kiiensis (Sowerby, 1915). Japan. Shelly bottoms, 50 to 150 m; common.



Parkinson's Triton (1.7") 4.5 cm
Cymatium parkinsonianum (Perry, 1811). Victoria; Tasmania; New Zealand. Offshore; common.



Distorted Rock Triton (2") 5 cm
Cymatium subdistortum (Lamarck, 1822). Southern Australia; Tasmania. Offshore, often beached; common.



Warted Sand Triton (0.8") 2 cm
Cymatium verrucosum (Reeve, 1844). Southern Australia; Tasmania. Shallow water; common.



* **Lesueur's Sand Triton** (0.8") 2 cm
Cymatium lesueuri Iredale, 1929. Southern Australia; Tasmania. Shallow water; common. Has pink apex.



Trigonal Hairy Triton (2") 5 cm
Cymatium trigonum (Gmelin, 1791). Western Africa; lower Caribbean. Shallow water; rare.



Pfeiffer's Hairy Triton (3") 7.5 cm
Cymatium pfeifferianum (Reeve, 1844). Indo-Pacific. On sand and mud, shallow water; uncommon.



Lined Hairy Triton (2") 5 cm
Cymatium lineatum (Broderip, 1833). Galapagos Islands. Offshore; uncommon. Resembles *C. krebsii* superficially.



Thin-lined Triton (1.7") 4.5 cm
Cymatium tenuiliratum (Lischke, 1873). Southern Japan. Offshore, 50 to 100 m; uncommon.



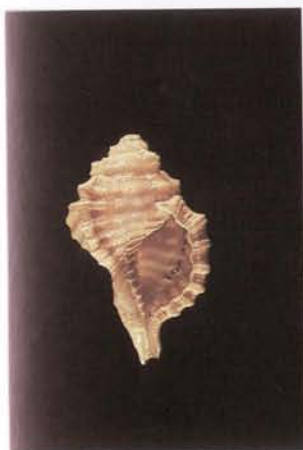
Short-neck Triton (2") 5 cm
Cymatium muricinum (Röding, 1798). Indo-Pacific; S.E. United States; West Indies. Shallow water; common.



Long-neck Triton (3") 7.5 cm
Cymatium gutturnium (Röding, 1798). Pacific. Offshore; uncommon. Syn.: *formosus* Perry; *clavator* Dillwyn.



Chinese Triton (3") 7.5 cm
Cymatium sinense (Reeve, 1844). Western Pacific; Queensland. Moderately deep water; uncommon.



Rehder's Triton (3") 7.5 cm
Cymatium testudinarium rehderi Verrill, 1950. Cuba to Lesser Antilles. Offshore to 400 m; rare.



Dog-head Triton (2") 5 cm
Cymatium moritinctum subspecies *caribbaeum* Clench & Turner, 1957. S. Carolina to Brazil. Shallow water; uncommon.



Yellow-lip Triton (2.5") 6.5 cm
Cymatium sarcostomum (Reeve, 1844). Indo-W. Pacific. Subtidal; uncommon.



Pear Triton (3") 7.5 cm
Cymatium pyrum (L., 1758). Indo-Pacific. On coral and sand; uncommon. Syn.: *muricatum* Röding.



Robin Redbreast Triton (1.5") 4 cm
Cymatium rubeculum (L., 1758). Tropical Indo-Pacific. Intertidal reefs; uncommon.



Black-striped Triton (2") 5 cm
Cymatium hepaticum (Röding, 1798). Tropical Indo-Pacific. Under coral slabs; uncommon. Black stripes diagnostic.



Tall Triton (1.5") 4 cm
Sassia semitorta (Kuroda & Habe, 1961). Japan. Dredged, 50 to 200 m; common.

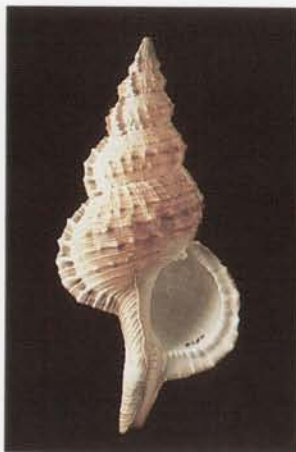


Hal Lewis's Triton (1") 2.5 cm
Sassia lewisi Harasewych & Petuch, 1980. Yucatan, Mexico, to Barbados. Rare. Holotype illus.

**Gaimard's Sand Triton**

(0.8") 2 cm

Sassia gaimardi (Iredale, 1929). Southern Australia. Shallow water; uncommon.

**Wandering Triton** • (5") 12.5 cm

Ranella olearium (L., 1758). Mediterranean; Africa; Australasia; Bermuda. Deep water; uncommon. Syn.: *gigantea* Lamarck.

**Beaded Triton** (4.5") 11.5 cm

Mayena gemmifera (Euthyme, 1889). South Africa; Mozambique. Offshore; uncommon.

**Austral Triton** (3.5") 9 cm

Mayena australasia (Perry, 1811). S. half of Australia; Tasmania; New Zealand. Rocky ground; common. Several subspecies.

**Neapolitan Triton** (4") 10 cm

Cymatium parthenopeum (von Salis, 1793). In nearly all tropical and warm seas. Offshore to 70 m; uncommon. Many synonyms.

**Scabrous Triton** (3") 7.5 cm

Priene scabrum (King, 1832). Peru to central Chile. 10 to 30 m; common.

**Peruvian Triton** (3") 7.5 cm

Priene rude (Broderip, 1833). Peru to central Chile. 10 to 18 m; common.

**Spined Maple Leaf** (1.7") 4.5 cm

Biplex aculeatum (Schepman, 1909.) Japan to W. Australia. Dredged, 200 m; uncommon. Syn.: *microstoma* Fulton.

**Kookaburra Triton** (1") 2.5 cm

Biplex jacundum (A. Adams, 1853). Indo-W. Pacific. In sand offshore; uncommon. Syn.: *pulchella* Forbes.

**Maple Leaf Triton** (2") 5 cm

Biplex perca (Perry, 1811). Western Pacific. Deep water; moderately common. Syn.: *pulchella* Sowerby.

**Maple Leaf Triton** (2") 5 cm

Biplex perca (Perry, 1811). Similar to *B. aculeatum* but has relatively larger aperture. Often very beaded.

**Tadpole Triton** (1") 2.5 cm

Gyrineum gyrinum (L., 1758). Tropical Pacific. Under coral slabs in shallow water; common. Syn.: *ranina* Lamarck.



Purple Gyre Triton (1") 2.5 cm
Gyrineum pusillum (Broderip, 1832). Tropical Pacific. On coral rubble or sandy mud; uncommon. Syn.: *facetum* Iredale.



Corded Gyre Triton (1.2") 3 cm
Gyrineum cuspidatum (Reeve, 1844). Indo-Pacific. Subtidal; uncommon. *G. bituberculare* (Lamarck, 1816) similar but siphonal canal longer.



Rosy Gyre Triton (1.2") 3 cm
Gyrineum roseum (Reeve, 1844). Tropical Pacific. Under coral below low-tide level; uncommon.



Tuberculate Gyre Triton (1.2") 3 cm
Gyrineum natator (Röding, 1798). Indo-Pacific. Shallow water. Syn.: *tuberculata* Broderip.



Argus Triton (3") 7.5 cm
Argobuccinum pustulosum (Lightfoot, 1786). South Africa. Offshore, sometimes beached; common. Syn.: *argus* Gmelin.



Mediterranean Bark Triton (3") 7.5 cm
Cabestana cutacea (L., 1767). Eastern Atlantic; Mediterranean; Cape Verde Islands. Moderate depths; uncommon.



Spengler's Triton (6") 15 cm
Cabestana spengleri (Perry, 1811). Southern Australia; Tasmania. Rock pools; common.



Ridged African Triton (2.5") 6.5 cm
Cabestana dolarium (L., 1767). South Africa. Offshore to 460 m and beached; common.



Felippone's Triton (2") 5 cm
Cabestana felipponei (von Ihering, 1907). Espirito Santo (Brazil) to Uruguay. On muddy sand offshore; rare.



South African Triton (4") 10 cm
Cabestana africana (A. Adams, 1855). South Africa. Offshore to deep water; moderately common.



Lesser Girdled Triton (1.5") 4 cm
Gelagna succincta (L., 1771). Indo-Pacific. Offshore; uncommon. Syn.: *clandestina* Lamarck.



Swollen Triton (4") 10 cm
Argobuccinum tumidum (Dunker, 1862). New Zealand. Rocky bottom; common.



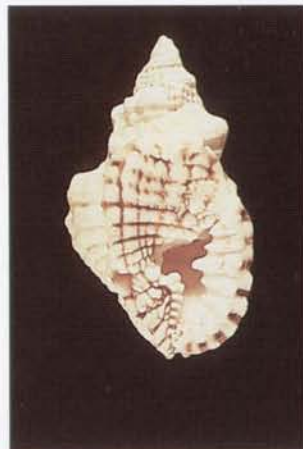
Magellanic Triton • (2.5") 6.5 cm
Fusitriton magellanicum (Röding, 1798). Southern South America; New Zealand; S. Australia. Offshore; uncommon. Syn.: *cancellatus* L.



Oregon Triton (4.5") 11.5 cm
Fusitriton oregonense (Redfield, 1848). Bering Sea to California. Offshore; common.



Common Distorsio (2.7") 7 cm
Distorsio anus (L., 1758). Indo-Pacific. Under coral, shallow water; uncommon. Syn.: *rotunda* Perry.



Checkerboard Distorsio (1.2") 4 cm
Distorsio burgessi Lewis, 1972. Hawaiian Islands (endemic). Offshore to 30 m; rare.



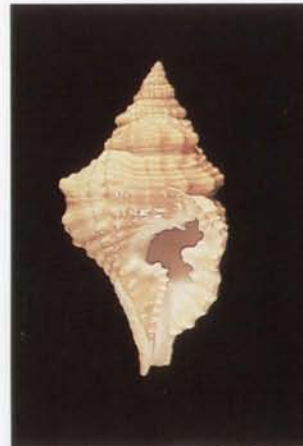
Decussate Distorsio (2") 5 cm
Distorsio decussata (Valenciennes, 1832). W. Mexico to Ecuador. Offshore to 85 m; uncommon. Syn.: *simillima* Sowerby.



Kurz's Distorsio (1.5") 3.5 cm
Distorsio kurzi Petuch & Harsen, 1980. Central Philippines. Deep water; uncommon. Holotype illustrated.



Reticulate Distorsio (2.4") 6 cm
Distorsio reticulata Röding, 1798. Indo-Pacific. Offshore to moderate depths; uncommon. Syn.: *cancellinus* Lamarck.



Smith's Distorsio (2.5") 6 cm
Distorsio smithi (von Maltzan, 1884). Western Africa. Offshore, 20 to 25 m; uncommon.



Constricted Distorsio (1.5") 4 cm
Distorsio constricta constricta (Broderip, 1833). Gulf of California to Ecuador. Offshore; uncommon.



McGinty's Distorsio (1.5") 4 cm
Distorsio constricta mcgintyi Emerson & Puffer, 1953. North Carolina to Florida; Brazil. Dredged, 50 m; common.



Atlantic Distorsio (2.5") 6.5 cm
Distorsio clathrata (Lamarck, 1816). North Carolina to Texas; Caribbean; Brazil. Offshore to 130 m; common.



Bristly Distorsio (2.5") 6.5 cm
Distorsio perdistorta Fulton, 1938. Caribbean; Japan; Madagascar. Deep water; uncommon. Syn.: *horrida* K. & Habe.

FROG SHELLS FAMILY BURSIDAE

Small family living in tropical or warm seas. Shells usually thick and heavy and have a deep canal at posterior end of aperture, the anterior canal being short. Operculum chitinous, oval, brown. Females may be larger than males. Most species live in or under coral and some eat marine worms. Egg capsules attached to rock or coral.



Giant Frog Shell (7") 18 cm
Bursa bubo (L., 1758). Indo-Pacific. Intertidal and offshore; common. Syn.: *gigantea* E. A. Smith; *lampas* of authors.



Ruddy Frog Shell (6") 15 cm
Bursa rubeta (Röding, 1798). Indo-Pacific. Intertidal and offshore; moderately common. Syn.: *tuberosum* Röding.



Red-mouth Frog Shell (6") 15 cm
Bursa lissostoma (E. A. Smith, 1914). Indo-Pacific. Intertidal and offshore to 50 m; moderately common. Syn.: *bufo* Röding.



Tall Frog Shell (3.5") 9 cm
Bursa condita (Gmelin, 1791). Southwestern Pacific. Offshore; uncommon. Syn.: *candisata* Dillwyn (and Lamarck).



Awati Frog Shell (2.7") 7 cm.
Bursa awatii Ray, 1949. India to Philippines. 180 to 550 m; rare. Syn.: *rehderi* Beu, 1978 (holotype illus.).



Dwarf Frog Shell (1.5") 4 cm
Bursa nana (Broderip & Sowerby, 1829). W. Mexico to Ecuador. Offshore to 40 m; common.



Fernandes's Frog Shell (3.5") 9 cm
Bursa fernandesi (Beu, 1977). Mozambique. Trawled 110 to 175 m; rare. Holotype illustrated.



Blackened Frog Shell (3") 7.5 cm
Bursa nigrita Mulhaus & Blocker, 1979. Madagascar. Offshore; uncommon.



Granulate Frog Shell (2") 5 cm
Bursa granularis (Röding, 1798). Indo-Pacific; Caribbean. Shallow and deeper water; common. Syn.: *cubaniana* Orbigny.



Chestnut Frog Shell (2") 5 cm
Bursa bufo (Bruguière, 1792). Southeastern Florida to Brazil. Dredged 50 to 100 m. Syn.: *spadicea* Montfort.



Pitted Frog Shell (2.5") 6.5 cm
Bursa scrobilator (L., 1758). Mediterranean; N.W. Africa. Offshore 15 to 40 m. *B. scrobilator* is misspelling.



Noble Frog Shell (2") 5 cm
Bursa margaritula (Deshayes, 1832). Indo-Pacific. Under coral, subtidal; uncommon. Syn.: *nobilis* Reeve.



Frilled Frog Shell (3") 7.5 cm
Bursa crumena form *foliata* (Broderip, 1825). Indian Ocean. *B. c. crumena* (Lamarck, 1816) lacks red in aperture.



Common Frog Shell (3") 7.5 cm
Bursa rana (L., 1758). Indo-Pacific. Offshore and beached; uncommon.



Elegant Frog Shell (3") 7.5 cm
Bursa elegans (Sowerby, 1835). Indian Ocean. Shallow water; common.



Spiny Frog Shell (2") 5 cm
Bursa echinata (Link, 1807). Indo-Pacific. Offshore; moderately uncommon. Syn.: *spinosa* Lamarck.



Swollen Bursa (2") 5 cm
Bursa ventricosa (Broderip, 1833). Peru and Ecuador. Below tide level; moderately common.



California Frog Shell (4") 10 cm
Bursa californica (Hinds, 1843). California; W. Mexico. Among rocks offshore and beached; common.



Pacamon Frog Shell (1.5") 4 cm
Bursa pacamoni Matthews & Coelho, 1971. S.E. Florida to Brazil. Offshore; rare.



Gaudy Frog Shell (2") 5 cm
Bursa corrugata (Perry, 1811). S.E. Florida to Brazil; W. Mexico to Peru. Offshore; uncommon. Syn.: *caelata* Broderip.



Warty Frog Shell (2.5") 6.5 cm
Bursa bufonia (Gmelin, 1791). Tropical Indo-Pacific. Under coral offshore; rare. Syn.: *leo* Shikama.



Wine-mouth Frog Shell (1") 2 cm
Bursa rhodostoma (Sowerby, 1835). Tropical Indo-Pacific. On sand and coral offshore; uncommon.



St. Thomas Frog Shell (.8") 2 cm
Bursa thomae (Orbigny, 1842). South Carolina to Brazil; Cape Verde Islands. Under rocks to 80 m; moderately common.



Finlay's Frog Shell (3") 7.5 cm
Bursa finlayi McGinty, 1962. S.E. Florida and West Indies. Uncommon.



Udder Frog Shell (2.5") 6 cm
Bursa mammata Röding, 1798. Southwestern Pacific. Near coral reefs; uncommon. Syn.: *rosa* Perry.



Lamarck's Frog Shell (2") 5 cm
Bursa lamarcki (Deshayes, 1853). S.W. Pacific. Shallow reefs; uncommon.



Blood-stained Frog Shell (1.5") 4 cm
Bursa cruentata (Sowerby, 1841). Indo-Pacific. Near coral; moderately common.



Charming Frog Shell (1") 2.5 cm
Bursa venustula (Reeve, 1844). Indo-Pacific. Coral reefs; moderately common.

MUREX SHELLS FAMILY MURICIDAE

This is a large and very diverse family, ranging from the beautiful, spiny Venus Comb Murex to the small, insignificant drupes and purpura rock shells. The genera in this family are very arbitrary and no two experts agree. The subfamily Thaidinae comprises the common rock-shells. Operculum corneous and brown.



Snipe's Bill Murex (5") 12.5 cm
Murex haustellum L., 1758. Indo-Pacific. 3 to 20 m; locally common. Typical form from southwestern Pacific.



Baker's Snipe's Bill (4") 10 cm
Murex longicaudus F. C. Baker, 1891. Red Sea to Philippines. Syn.: *vicdani* Kosuge. Common.



Multiplicate Snipe's Bill (2.5") 6 cm
Murex multiplicatus Sowerby, 1895. Western Australia. Off-shore; uncommon.



Venus Comb Murex (4") 10 cm
Murex pecten Lightfoot, 1786. Indo-Pacific. Common. Syn.: *ternispina* Lamarck; *tiremis* Perry.



Troschel's Murex (6") 15 cm
Murex troscheli Lischke, 1868. Western Pacific. Common in Japan, 1 to 15 m.



Woodcock Murex (4") 10 cm
Murex scolopax Dillwyn, 1817. Indo-Pacific. Common. Lectotype illus. (Wales Museum). Syn.: *acanthostephes* Watson.



Rare-spined Murex (4") 10 cm
Murex trapa Röding, 1798. Southwestern Pacific. Common. Syn.: *rarispinga* Lamarck.



Caltrop Murex (3") 7 cm
Murex tribulus L., 1758. Indo-Pacific. Common.



Black-spined Murex (3") 7 cm
Murex nigrispinosus Reeve, 1845. Southwestern Pacific. 3 to 20 m; common.



Bent-spined Murex (3") 7 cm
Murex aduncospinosus Sowerby, 1841. Southeastern Asia; Philippines. Uncommon.



Carbonnier's Murex (2.5") 6 cm
Murex carbonnieri Jousseaume, 1881. Red Sea. Uncommon.



Erect-spined Murex (3") 7.5 cm
Murex rectirostris Sowerby, 1841. East Asia. Offshore; common. Syn.: *sobrinus* A. Adams.



Brevispined Murex (3") 7.5 cm
Murex brevispina Lamarck, 1822. Indo-Pacific. Common.



MacGillivray's Murex (3") 7.5 cm
Murex macgillivrayi Dohrn, 1863. Northern Australia. Common. Form of *brevispina*?



Heros Murex (3") 7.5 cm
Murex heros Fulton, 1936. New Guinea and Solomon Islands. Offshore; uncommon.



Striking Murex (3") 7.5 cm
Murex concinnus Reeve, 1845. Indo-Pacific. Shallow water; uncommon.



Malabar Murex * (3.5") 9 cm
Murex mindanoensis Sowerby, 1841, subsp. *malabaricus* E. A. Smith, 1895. Philippines. 20 to 100 m; uncommon.



Harrowed Murex (3") 7.5 cm
Murex occa Sowerby, 1834. Southeastern Asia. Uncommon. May be form of *scolopax*.



Hirase's Murex (2.5") 6 cm
Murex hirasei Hirase, 1915. Japan to Taiwan. Offshore; uncommon.



Kii Murex (3.5") 9 cm
Murex kiiensis Kira, 1959. Indo-Pacific. Deep water; uncommon.



Tweed Murex (2.5") 6 cm
Murex tweedianus Macpherson, 1962. Eastern Australia. Common. Syn.: *espinosa* Macpherson.



Cabrit's Murex (2.5") 6 cm
Murex cabritii Bernardi, 1859. S.E. United States. Offshore; uncommon.



Tryon's Murex (2") 5 cm
Murex tryoni Hidalgo, 1880. Gulf of Mexico; Caribbean. 100 to 350 m; uncommon.



Rose Murex (1.5") 4 cm
Murex rubidus F. C. Baker, 1897. S.E. United States; Bahamas. Locally common. Shallow water.



Sallasi's Murex (1.5") 4 cm
Murex sallasi Rehder & Abbott, 1951. Gulf of Mexico. 50 to 100 m. Rare. Holotype illustrated.



Belleglade Murex (1.5") 4 cm
Murex bellegladensis E. Vokes, 1963. Gulf of Mexico. Uncommon. Deep water.



Don Moore's Murex (2") 5 cm
Murex cabritii subspecies *donmoorei* Bullis, 1964. Southern Caribbean. Deep water; locally common.



Goldmouth Murex (2") 5 cm
Murex chrysostoma Sowerby, 1834. Southern Caribbean to Brazil. Offshore; locally common.



Belle Murex (2") 5 cm
Murex chrysostoma form *bellus* Reeve, 1845. A bright form of the Goldmouth Murex. Uncommon.



Thompson's Murex (2") 5 cm
Siratus articulatus form *thompsoni* Bullis, 1964. Southern Caribbean; deep water; uncommon. Holotype illustrated.



Bent-beak Murex (2.5") 6 cm
Murex recurvirostris Broderip, 1833. W. Mexico to Ecuador. Shallow water; common.



Elena Murex (2.5") 6 cm
Murex elenensis Dall, 1909. W. Mexico to Ecuador. Shallow water; uncommon.



Messorius Murex (2.5") 6 cm
Murex messorius Sowerby, 1841. Lower Caribbean. Shallow water; common. Syn.: *woodringi* Clench.



Tricorn Murex (2.5") 6 cm
Murex elenensis form *tricornis* S.S. Berry, 1960. Gulf of California. Uncommon.



Near-elegant Murex (3") 7.5 cm
Siratus perelegans E. Vokes, 1965. West Indies. Offshore to 50 m; uncommon. Syn.: *elegans* Sowerby.



Caillet's Murex (3") 7.5 cm
Siratus cailleti Petit, 1856. West Indies. Offshore to 50 m; uncommon. Syn.: *kugleri* Clench & Farfante.



Beauty Murex (3") 7.5 cm
Siratus formosus Sowerby, 1841. Caribbean. 20 to 100 m; uncommon. Siphon not crooked. Syn.: *aguayoi* C. & F.



Finlay's Murex (3") 7.5 cm
Siratus formosus Sowerby, form *finlayi* Clench, 1955. Caribbean. 100 to 300 m; uncommon.



Antillean Murex (3") 7.5 cm
Siratus articulatus Reeve, 1845. Caribbean. 100 to 300 m; uncommon. *Murex antillarum* Hinds is unidentifiable.



Springer's Murex (3") 7.5 cm
Siratus springeri (Bullis, 1965). Lower Caribbean to Brazil. Deep water; uncommon.



Ciboney Murex (3") 7.5 cm
Siratus ciboney (Clench & Farfante, 1945). Caribbean; deep water; uncommon. Holotype illus.



Wagtail Murex (3") 7.5 cm
Siratus motacilla (Gmelin, 1791). Lesser Antilles; West Indies. Moderately common.



Beau's Murex (4") 10 cm
Siratus beauui (Fischer & Bernardi, 1857). Florida to Brazil. 200 to 400 m; locally uncommon. Syn.: *branchi* Clench.



Consuela's Murex (2.5") 6 cm
Siratus consuela A. H. Verrill, 1950. Eastern Caribbean. Uncommon. Syn.: *pulcher* A. Adams.



Senegal Murex (3") 7.5 cm
Siratus senegalensis (Gmelin, 1791). Brazil. Shallow water. Locally common.



Hen Murex (2.5") 6 cm
Siratus gallinago (Sowerby, 1903). Japan. Offshore; uncommon.



Ellis Cross's Murex (3") 7 cm
Siratus elliscrossi Fair, 1974. Japan; uncommon.



Lovely Murex (2") 5 cm
Siratus venustulus (Rehder & Wilson, 1975). Marquesas Islands, East Polynesia. 18 to 125 m; rare. Holotype illus.



Superb Murex (2.5") 6 cm
Siratus superbus (Sowerby, 1889). Eastern Asia. Offshore; common.



Lacinate Murex (2.5") 6 cm
Siratus laciniatus (Sowerby, 1841). Indo-Pacific. Shallow water; uncommon.



Barclay's Murex (2") 5 cm
Naquetia barclayi (Reeve, 1858). Indian Ocean. Offshore; rare.



Annandale's Murex (2.5") 6 cm
Naquetia annandalei (Preston, 1910). India to Philippines. Offshore; uncommon.



Trigonula Murex (2") 5 cm
Naquetia trigonulus (Lamarck, 1816). Southwestern Pacific. Uncommon.



Triquetra Murex (2") 5 cm
Naquetia triquetra (Born, 1778). Indian Ocean to Indonesia. Shallow water; uncommon.



Thin-bladed Murex (4") 10 cm
Siratus tenuivaricosus (Dautzenberg, 1927). Brazil. Offshore; uncommon. Syn.: *caricoca* E. Vokes.



Japanese Spike Murex (4") 10 cm
Siratus pliciferoides (Kuroda, 1942). Japan; offshore to 200 m; common.



Alabaster Murex (5") 12 cm
Siratus alabaster (Reeve, 1845). Japan to the Philippines. Deep water; locally common.



Stainforth's Murex (2.5") 6 cm
Chicoreus stainforthi (Reeve, 1843). Northern Australia. Littoral to 3 m; locally common.



Apple Murex (3") 7.5 cm
Phyllonotus pomum (Gmelin, 1791). S.E. United States to Brazil. 1 to 20 m; common.



Globular Apple Murex (2.5") 6 cm
Phyllonotus globosus (Emons, 1858). S. Caribbean. May be subspecies of *pomum*. Common.



Margarita Murex (4") 10 cm
Phyllonotus margaritensis (Abbott, 1958). Lower Caribbean. Uncommon. Rarely yellow-mouthed.



Oculate Apple Murex (3") 7.5 cm
Phyllonotus pomum form *oculatus* Reeve, 1845. Deep water Florida; West Indies. Locally uncommon.



Endive Murex (4") 10 cm
Chicoreus cichoreum (Gmelin, 1791). Southwestern Pacific. Abundant. Syn.: *endivia* Lamarck.



Trunculus Murex (3") 7.5 cm
Hexaplex trunculus (L., 1758). Mediterranean. Shallow water; common.



Rosy-mouth Murex (3") 7.5 cm
Hexaplex rosarium (Röding, 1798). Cape Verde Islands; West Africa; common. Syn.: *saxatilis* of authors.



Duplex Murex (3.5") 9 cm
Hexaplex duplex (Röding, 1798). Western Africa. Common. Also once called *saxatilis* L.



Pink-mouth Murex (4") 10 cm
Phyllonotus erythrostomus
Swainson, 1831. W. Mexico to
Peru. Abundant. Syn.: *bicolor*
Valenciennes.



Regal Murex (5") 12 cm
Phyllonotus regius (Swainson,
1821). W. Mexico to Peru. Mod-
erately common.



Cabbage Murex (9") 20 cm
Phyllonotus brassica (Lamarck,
1822). W. Mexico to Peru. Fairly
common.



Prince Murex (5") 13 cm
Hexaplex princeps (Broderip,
1833). W. Mexico to Peru. Mod-
erately common.



Küster's Murex (3") 7.5 cm
Hexaplex kuesterianus (Tap-
parone-Canefri, 1875). Western
Africa. Uncommon.



Angular Murex (2") 5 cm
Hexaplex angularis (Lamarck,
1822). Western Africa. Fairly
common in shallow water.



Varius Murex (2") 5 cm
Hexaplex varius (Sowerby,
1834). Western Africa. Fairly
common locally.



Thick-spined Murex (3") 7.5 cm
Chicoreus megacerus (So-
werby, 1834). Western Africa.
Shallow water; uncommon.



Virgin Murex (4") 10 cm
Chicoreus virgineus (Röding,
1798). Red Sea. Shallow water.
Locally common. Syn.: *anguli-*
ferus Lamarck.



Diver Murex (2") 5 cm
Chicoreus mergus E. Vokes,
1974. Caribbean (Barbados). 91
m; rare. Holotype illustrated.



West Indian Murex (5") 12 cm
Chicoreus brevifrons (Lamarck,
1822). West Indies to Brazil.
Fairly common; shallow water.



Giant Eastern Murex (6") 15 cm
Hexaplex fulvescens (Sowerby,
1834). North Carolina to Texas.
Common offshore to intertidal.



Asian Murex (4") 10 cm
Chicoreus asianus Kuroda, 1942. Japan and northern China. Common offshore. Syn.: *elongatus* Lamarck.



Martin's Murex (1") 2.5 cm
Murexiella martini Shikama, 1977. Central Philippines. Deep water; uncommon.



Smelly Murex (3") 7.5 cm
Chicoreus cnissodus (Euthyme, 1889). Japan to New Caledonia. Shallow reefs; uncommon. Syn.: *oligocanthus* Euthyme.



Spectral Murex (4") 10 cm
Chicoreus spectrum (Reeve, 1846). West Indies to Brazil. Uncommon. Holotype illustrated.



Saul's Murex (4") 10 cm
Chicoreus saulii (Sowerby, 1841). Southwestern Pacific. Offshore; uncommon. Columellar edge white.



Rose-branch Murex (4") 10 cm
Chicoreus palmarosae (Lamarck, 1822). Sri Lanka to S.W. Pacific. Uncommon. Syn.: *foliatus* Perry.



Maurus Murex (3") 7.5 cm
Chicoreus maurus (Broderip, 1833). Central Pacific. Uncommon. Syn.: *steeriae* Reeve (from Marquesas).



Mangrove Murex (2") 5 cm
Chicoreus capucinus (Lamarck, 1816). Southwestern Pacific. Mangrove roots; common.



Firebrand Murex (3") 7.5 cm
Chicoreus torrefactus (Sowerby, 1841). Indo-Pacific. Shallow water; common. Syn.: *affinis* Reeve.



Curly Murex (3") 7.5 cm
Chicoreus microphyllus (Lamarck, 1816). Indo-Pacific. Shallow water; common. Syn.: *poirieri* Jousseaume.



Banks's Murex (3") 7.5 cm
Chicoreus banksii (Sowerby, 1841). Indo-Pacific. Uncommon.



Denuded Murex (2") 5 cm
Chicoreus denudatus (Perry, 1811). Eastern Australia. Common. Syn.: *palmiferus* Sowerby.



Reddish Murex (4") 10 cm
Chicoreus rubiginosus (Reeve, 1845). Southwestern Pacific. Locally common.



Penchinat's Murex (1.5") 4 cm
Chicoreus penchinati (Crosse, 1861). Japan to Taiwan. Off-shore; uncommon.



Rossiter's Murex (1.5") 4 cm
Chicoreus rossiteri (Crosse, 1872). Southwestern Pacific. Shallow water; uncommon. *C. saltatrix* Kuroda, 1964, is subsp.



Pendant Murex (2") 5 cm
Chicoreus aculeatus (Lamarck, 1822). Japan to Philippines. Off-shore; uncommon. Syn.: *artemis* Radwin & D'Attilio.



Cosman's Murex (2") 5 cm
Chicoreus cosmani Abbott and Finlay, 1979. Central Caribbean. Subtidal to 20 m; rare. Paratype illustrated.



Trivial Murex (2") 5 cm
Chicoreus trivialis (A. Adams, 1854). Japan to Australia. Uncommon.



Rubescens Murex (1.5") 4 cm
Chicoreus rubescens (Brodier, 1833). Southwestern Pacific. Shallow water. Uncommon.



Adusta Murex (2.5") 6 cm
Chicoreus brunneus (Link, 1807). S.W. Pacific. Abundant; sublittoral. Syn.: *adustus* Lamarck.



Lace Murex (3") 7.5 cm
Chicoreus dilectus (A. Adams, 1855). S.E. United States. Subtidal; common. Syn.: *arenarius* Clench & Farfante.



Saffron Murex (2") 5 cm
Chicoreus crocatus (Reeve, 1845). Philippines. 5 to 30 m; locally uncommon.



Bojador Murex (1.7") 4 cm
Murexiella bojadorensis Locard, 1897. West Africa. Off-shore; uncommon.



Gubb's Murex (2.5") 6 cm
Chicoreus gubbi (Reeve, 1849). Western Africa. Shallow water; uncommon.



Thomas's Murex (2") 5 cm
Chicoreus thomasi (Crosse & Fischer, 1872). Marquesas Islands. Rare. Paratype illus.



Ramoses Murex (8") 20 cm
Chicoreus ramosus (L., 1758). Indo-Pacific. Shallow reefs; very common.



Radish Murex (5") 12 cm
Hexaplex radix (Gmelin, 1791). Panama to Ecuador. Shallow water; common.



Nigrite Murex (6") 15 cm
Hexaplex nigritus (Philippi, 1845). Gulf of California. Intertidal; common.



Deer Antler Murex (2.5") 6 cm
Chicoreus cervicornis (Lamarck, 1822). Northern Australia. Shallow water. Fairly common.



Monodon Murex (4") 10 cm
Chicoreus cornucervi (Röding, 1798). Northwestern Australia. Littoral. Uncommon. Syn.: *monodon* Sowerby.



Axicornis Murex (3") 7.5 cm
Chicoreus axicornis (Lamarck, 1822). Japan to the Philippines. Offshore; uncommon. Syn.: *kawamurai* Shikama.



Damicornis Murex (2") 5 cm
Chicoreus damicornis (Hedley, 1903). Northern Australia. Common. Lower specimen is rare sinistral form.



Orchid Murex * (1.5") 4 cm
Pterynotus orchidiflorus (Shikama, 1973). Off Taiwan. Uncommon. *P. cerinamarumai* Kosuge, 1980, is variant.



Purple Dye Murex (3.5") 9 cm
Bolinus brandaris (L., 1758). Mediterranean and N.W. Africa. Locally abundant.



Horned Murex (6") 15 cm
Bolinus cornutus (L., 1758). Western Africa; Cape Verde Islands. Offshore; common.



West African Murex (2") 5 cm
Homalocantha melanamathos (Gmelin, 1791). West Africa. Offshore; uncommon.



Zambo's Murex (2") 5 cm
Homalocantha zamboi Burch & Burch, 1960. Central Philippines. 1 to 5 m; locally common.



Scorpion Murex (2") 5 cm
Homalocantha scorpio (L., 1758). Southwestern Pacific. Common; shallow water. Rarely albino.



Anatomical Murex (2") 5 cm
Homalocantha anatomica (Perry, 1811). Indo-Pacific. Shallow reef waters; uncommon. Syn.: *rota* Mawe.



Faurot's Murex (2") 5 cm
Homalocantha fauroti (Jousseaume, 1888). Red Sea. Shallow water; uncommon.



Anomalous Murex (1.5") 4 cm
Homalocantha anomaliae Kosuge, 1979. Central Philippines. 100 m; rare. Stunted *scorpio*?



Fenestrate Murex (1.5") 4 cm
Marchia martinetana (Röding, 1798). S.W. Pacific. Shallow reefs; uncommon. Syn.: *fenestrata* Dillwyn.



Favored Murex (2") 5 cm
Homalocantha secundus (Lamarck, 1822). Southwestern Pacific; Australia. Uncommon.



Digitate Murex (2") 5 cm
Homalocantha digitata (Sowerby, 1841). Red Sea. Shallow water. Uncommon.



Sharp-spined Murex (2.5") 6 cm
Homalocantha oxyacantha (Broderip, 1833). Mexico to Ecuador. Shallow water; uncommon.



Capetown Murex (1") 2.5 cm
Poropteron capensis (Sowerby, 1841). South Africa. Offshore to 30 m; common.



Hooked Murex (1") 2.5 cm
Poropteron uncinarius (Lamarck, 1822). South Africa. Offshore to 30 m; common.



Bibbey's Murex (1.5") 3.5 cm
Marchia bibbeyi Radwin & D'Attilio, 1976. Japan. Offshore in 300 m; rare.



Loebbecke's Murex (2") 5 cm
Pterynotus loebbeckei (Kobelt, 1879). Southeast Asia; southern Japan. Deep water; rare.



Miyoko Murex (2.5") 6 cm
Pterynotus loebbeckei subspecies *miyokoae* Kosuge, 1979. Philippines. Deep water; rare.



Leafy-winged Murex (3") 7.5 cm
Pterynotus phyllopterus (Lamarck, 1822). Lesser Antilles, West Indies. 10 to 30 m; uncommon.



Pellucid Murex (2") 5 cm
Pterynotus pellucidus (Reeve, 1845). Indo-Pacific. Offshore to 30 m; uncommon.



Bednall's Murex (3") 7.5 cm
Pterynotus bednalli (Brazier, 1878). Northern Australia. Shallow water; locally uncommon to rare.



Pinnate Murex (7.3") 16 cm
Pterynotus alatus (Röding, 1798). Southeastern Asia; East Indies. Subtidal; uncommon. Syn.: *pinnatus* Swainson.



Three-winged Murex (2") 5 cm
Pterynotus tripterus (Born, 1778). Indo-Pacific. Subtidal; uncommon.



Thorny-winged Murex (4") 9 cm
Pterynotus acanthopterus (Lam., 1816). W. Australia. Shallow water; fairly common. Syn.: *phillipsi* E. Vokes.



Triple Murex (2.5") 6 cm
Pterynotus triformis (Reeve, 1845). Australia. Shallow sandy and grassy areas; common.



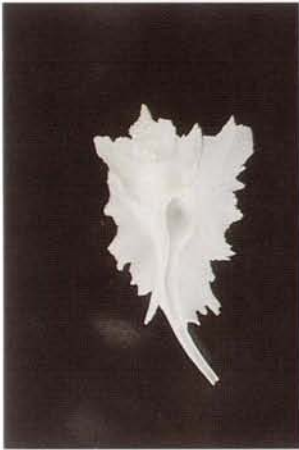
Vokes's False Murex (2.5") 6 cm
Pteropurpura vokesae Emerson, 1964. California. Offshore; rare. Syn.: *M. rhyssus* Dall (holotype illus.), not Tate.



Gambia Murex (2.5") 6 cm
Purpurellus gambiensis (Reeve, 1845). Western Africa. Uncommon.



Phaneus Murex (1.5") 3.5 cm
Pterynotus phaneus (Dall, 1889). Caribbean. Deep water; rare. Syn.: *tristichus* Dall; *havanensis* E. Vokes.



Lightbourn's Murex (1") 2.5 cm
Pterynotus lightbourni Harasewych & Jensen, 1979. Off Bermuda; 27 to 60 m; rare. Holotype illustrated.



Guest's Murex (1") 2.5 cm
Pterynotus guesti Harasewych & Jensen, 1979. Off Key West, Florida, in 275 m; rare. Holotype illustrated.



Radwin's Murex (1.2") 3 cm
Pterynotus radwini Harasewych & Jensen, 1979. Off Belize, Honduras, in 300 m; rare. Holotype illustrated.



Butterfly Murex (1.4") 3.5 cm
Pterynotus vespertilio (Kira, 1959). Japan. Offshore to 100 m; moderately common.



Pinniger Murex (2.5") 6 cm
Purpurellus pinniger (Broderip, 1833). W. Mexico to Ecuador. Deep water; rare. Syn.: *osseus* Reeve; *inezana* Durham, 1950.



Fluted Murex (2") 5 cm
Pterynotus laqueatus (Sowerby, 1841). Western Pacific. Offshore; rare.



Club Murex (3") 7.5 cm
Pterynotus elongatus (Lightfoot, 1786). Indo-Pacific. Shallow reefs; uncommon. Rarely pink. Syn.: *clavus* Kiener.



Pinnacle Murex (2") 5 cm
Marchia bipinnatus (Reeve, 1845). Indo-Pacific. Rare. Sometimes placed in *Pterynotus*. Aperture violet.



Better Murex (1") 2.5 cm
Pterochelus ariomus (Clench & Farfante, 1945). Off southeastern Florida in 100 m; rare.



Exquisite Murex (1") 2.5 cm
Subpterynotus exquisitus (Sowerby, 1904). Western Africa. Rare.



Bequaert's Murex (1.4") 3.5 cm
Pteropurpura bequaerti (Clench & Farfante, 1945). S.E. United States. Offshore; rare.



Decussate Murex (1.5") 4 cm
Jaton decussatus (Gmelin, 1791). Western Africa. Shallow water; uncommon.



Frill-wing Murex (2.5") 6 cm
Pteropurpura macroptera (Deshayes, 1839). Northern California. Offshore; common.



Esychus Murex (1.5") 3.5 cm
Pteropurpura esycha (Dall, 1925). Off Japan in 210 m; very rare. Holotype illustrated.



Adunca Murex (1.5") 3.5 cm
Pteropurpura adunca (Sowerby, 1834). Central Japan. Shallow water; common. Syn.: *eurypteron* Reeve.



Expansive Murex (1.5") 3.5 cm
Pteropurpura adunca form *expansa* Sowerby, 1860. Japan. Offshore; uncommon.



Weeping Murex (2") 5 cm
Pteropurpura plorator (Adams & Reeve, 1849). Southeastern Japan. Shallow water; common.



Centrifuge Murex (2.3") 6 cm
Pteropurpura centrifuga (Hinds, 1844). Gulf of California; Galapagos. Offshore. Uncommon. Syn.: *deroyana* Berry.



Three-winged Murex (2.5") 6 cm
Pteropurpura trialata (Sowerby, 1834). California and W. Mexico. Intertidal rocks; common.



Festive Murex (2") 5 cm
Pteropurpura festiva (Hinds, 1844). California and W. Mexico. Intertidal to 3 m; common.



Burnett's Murex (4") 10 cm
Ceratostoma burnetti (Adams & Reeve, 1849). Japan Sea; Korea; north China. Offshore to 10 m; locally common.



Fournier's Purpura (2.2") 6 cm
Ceratostoma fournieri (Crosse, 1861). North China; east Japan. Shallow water; common.



Nuttall's Purpura (2") 5 cm
Ceratostoma nuttalli (Conrad, 1837). California and W. Mexico. Littoral; common.



Dingy Purpura (2") 5 cm
Ceratostoma lugubre (Bonderip, 1833). Costa Rica to Peru. Littoral; common. Syn.: *fontainei* Tryon.



New Zealand Murex (2.5") 6 cm
Poirieria zelandicus (Quoy & Gaimard, 1833). New Zealand. Offshore; moderately common.



Paz's Murex (2") 5 cm
Poirieria pazi (Crosse, 1869). Florida and Caribbean. 200 to 400 m; uncommon.



Orr's Muricop (1") 2.5 cm
Muricopsis orri Cernohorsky, 1976. Thailand. Offshore; uncommon.



Nutting's Murex (1.5") 4 cm
Poirieria nuttingi (Dall, 1896). Off Florida. 100 to 400 m; uncommon. Syn.: *oregonia* Bul-
lis. Holotype illus.



Octagon Murex (2") 5 cm
Murexsul octogonus (Quoy & Gaimard, 1833). New Zealand. Subtidal rocks; fairly common.



Hidalgo's Murex (1.5") 4 cm
Murexiella hidalgoi (Crosse, 1869). S.E. United States and Caribbean. Deep water; uncommon.



McGinty's Murex (1") 2.5 cm
Murexiella macgintyi (M. Smith, 1938). Caribbean to Brazil. Shallow water; locally uncommon.



Humilis Murex (1.5") 3.5 cm
Murexiella humilis (Broderip, 1833). Gulf of California to Ecuador. Shallow water; uncommon. Syn.: *laurae* E. Vokes.



Girdled Dwarf Murex (0.8") 2 cm
Murexiella balteatus (Sowerby, 1841). Indo-Pacific. Shallow water rocks; uncommon.



Burr Murex (1.3") 3 cm
Murexiella lappa (Broderip, 1833). Gulf of Mexico to Ecuador. Shallow water; uncommon.



Gem Murex (1") 2.5 cm
Maxwellia gemma (Sowerby, 1879). Central California to Baja California. Intertidal rubble to 60 m; common.



Coronate Typhis * (1.5") 4 cm
Typhis coronatus Broderip, 1833. W. Mexico to Ecuador. Sublittoral. Locally common; under rocks.



Hexagonal Muricop (1.5") 4 cm
Muricopsis oxytatus (M. Smith, 1938). Florida and the West Indies. Syn.: *hexagonus* Lamarck, not Gmelin. Common.



Blainville's Muricop (1.2") 3 cm
Muricopsis blainvillei (Payraudeau, 1826). Mediterranean. Intertidal; common. Variable.



Mactan Dwarf Murex
(0.7") 1.8 cm
Favartia mactanensis Emerson & D'Attilio, 1979. Central Philippines. 30 m; uncommon.



Pitted Dwarf Murex (1") 2.5 cm
Favartia cellulosa (Conrad, 1846). S.E. United States to Brazil. Syn.: *nucea* Mörch. Very common; intertidal.



Dorothy's Dwarf Murex
(.6") 1.5 cm
Favartia dorothyae Emerson & D'Attilio, 1979. Central Philippines. Offshore; 10 m; uncommon.



Pelepili Dwarf Murex
(1") 2.5 cm
Favartia pelepili D'Attilio & Bertsch, 1980. Central Philippines. Offshore; uncommon.



Salmon Dwarf Murex
(.7") 1.8 cm
Favartia salmonea (Melvill & Standen, 1899). Indo-Pacific. Shallow water; uncommon. Syn.: *pumilus* A. Adams.



Rugged Vitularia (3") 7.5 cm
Vitularia salebrosa (King & Broderip, 1832). W. Mexico to Panama; Galapagos. Rather common.



Thick-lipped Drill (1") 2.5 cm
Eupleura caudata (Say, 1822). New England to Florida. Shallow water on oyster banks; abundant.



Atlantic Oyster Drill (1") 2.5 cm
Urosalpinx cinerea (Say, 1822). Eastern Canada to N.E. Florida; Washington to California. On oyster banks; abundant.



Spindle Dwarf Triton (0.8") 2 cm
Urosalpinx fusulus (Brocchi, 1814). Mediterranean; western Europe. Offshore; uncommon.



Spotted Vitularia (2") 5 cm
Vitularia miliaris (Gmelin, 1791). S.W. Pacific. Coral reefs; locally common.



Poulson's Dwarf Triton (1.5") 3.5 cm
Ocenebra poulsoni (Carpenter, 1864). California to Baja California. Littoral rocks; common.



Spineless Dwarf Triton (2") 5 cm
Ocenebra inermicosta E. Vokes, 1964. Western Africa. Intertidal; common. Syn.: *fasciata* Sowerby, not Gmelin.



Sting Winkle (1.2") 3 cm
Ocenebra erinacea (L., 1758). Northwestern Europe to northwestern Africa. Littoral; common.



Paiva's Dwarf Triton (1") 2.5 cm
Bedeleva paivae (Crosse, 1864). Southern Australia; Tasmania. Shallow water; common. Syn.: *hanleyi* Angas.



File Dogwinkle (1.5") 3.5 cm
Nucella lima (Gmelin, 1791). Alaska to northern California. Littoral; common.



Emarginate Dogwinkle (1") 2.5 cm
Nucella emarginata (Deshayes, 1839). Bering Sea to W. Mexico. Littoral rocks; abundant.



Frimled Dogwinkle (2.5") 6 cm
Nucella lamellosa (Gmelin, 1791). Bering Sea to California. Littoral; common. Very variable.



Atlantic Dogwinkle (2") 5 cm
Nucella lapillus (L., 1758). Eastern Canada to New York; Norway to Portugal. Rocky coasts; common. Very variable.



Corded Rock-shell (1.3") 3 cm
Trochia cingulata (L., 1758). South Africa. Lower littoral rock zone; common.



Orb Rock-shell (3.5") 9 cm
Neothais orbita (Gmelin, 1791). New Zealand; eastern Australia. Rocky shores; common.



Carinate Rock-shell (2") 5 cm
Cuma lacera (Born, 1778). Indian Ocean to S.E. Asia. Littoral; common. Syn.: *carinifera* Lamarck; *mutabilis* Link.



Biconic Rock-shell (1") 2.5 cm
Cronia biconica (Blainville, 1832). Indo-Pacific. Intertidal; moderately common.



Whelk Purpura ★ (1") 2.5 cm
Thais buccinea (Deshayes, 1844). S. W. Pacific. Intertidal rocks; locally common.



Barnacle Rock-shell (2.7") 7 cm
Concholepas concholepas (Bruguère, 1792). Peru and Chile. Littoral; common. Syn.: *peruvianus* Lamarck.



Wide-mouthed Purpura
(3") 7.5 cm
Purpura patula (L., 1758). S.E. Florida and the West Indies. Intertidal rock cliffs; common.



Columella Purpura (2") 5 cm
Purpura columellaris Lamarck, 1822. Southwestern Mexico to Chile. Locally uncommon.



Drinking Cup Purpura
(3") 7.5 cm
Purpura haustorium (Gmelin, 1791). New Zealand. Intertidal rocks; common.



Persian Purpura (2.5") 6 cm
Purpura persica (L., 1758). Southwestern Pacific to Japan. Intertidal rocks; common.



Rudolph's Purpura (2.5") 6 cm
Purpura panama (Röding, 1798). East Indies. Littoral rocks; common. Syn.: *rudolphi* Lamarck.



Muricate Purpura (2.5") 6 cm
Neorapana muricata (Broderip, 1832). W. Mexico to Ecuador. Intertidal; fairly common.



Eye-of-Judas Purpura
(2.5") 6 cm
Purpura planospira Lamarck, 1822. W. Mexico to Peru; Galapagos. Uncommon. Syn.: *picta* Perry (a suppressed name).



Nodose Purpura (3") 7.5 cm
Purpura nodosa (L., 1758). Brazil; western Africa. Littoral rocks; locally common.



Tuberculate Purpura (2") 5 cm
Neorapana tuberculata (Sowerby, 1835). W. Mexico. Intertidal rocks; common.



Toad Purpura (2.5") 6 cm
Thais bufo (Lamarck, 1822). Indo-Pacific. Intertidal rocks; common.



Gourd Rock-shell (2") 5 cm
Thais melones (Duclos, 1832).
W. Mexico to Peru; Galapagos.
Rocky shores; common.



Chocolata Rock-shell (2") 5 cm
Thais chocolata (Duclos, 1832).
Ecuador to Peru. Rocky shores;
common.



Hays's Rock-shell (3") 7.5 cm
Thais haemastoma form
canaliculata (Gray, 1839). N.W.
Gulf of Mexico. Oyster banks;
common. Syn.: *haysae* Clench.



Florida Rock-shell (2") 5 cm
Thais haemastoma subspecies
floridana (Conrad, 1837). S.E.
United States to Brazil. Intertidal
muddy rocks; common.



Two-row Rock-shell (2.5") 6 cm
Thais haemastoma subspecies
biserialis (Blainville, 1832). W.
Mexico to Chile. Littoral; com-
mon.



Tuberose Rock-shell (2") 5 cm
Thais tuberosa Röding, 1798.
S.W. and central Pacific. Coral
shores; common. Syn.: *pica*
Blainville.



Kiener's Rock-shell (1.5") 3.5 cm
Thais kieneri (Deshayes, 1844).
Japan to Australia. Littoral
rocks; common.



Chestnut Rock-shell
(1.5") 3.5 cm
Thais hippocastanum (L., 1758).
Southwestern Pacific. Rocky
shores; common.



Aculeate Rock-shell (2") 5 cm
Thais aculeata Deshayes, 1844.
Southeastern Asia. Rocky
shores; common.



Intermediate Rock-shell
(1.5") 3.5 cm
Thais intermedia (Kiener, 1836).
Polynesia; southwestern Paci-
fic. Reef edges; common.



Bituberculate Rock-shell
(1.5") 4 cm
Thais bitubercularis (Lamarck,
1822). Philippines to eastern Af-
rica. Intertidal rocks; common.



Tissot's Rock-shell (0.6") 1.5 cm
Thais tissoti (Petit, 1852). Indian
Ocean; Andaman Sea. Intertidal;
common.



Bicostral Rock-shell (2.4") 6 cm
Thais bicostralis Lamarck, 1816.
South Africa. Intertidal rocks;
common. Syn.: *capensis* Petit.



Speciosa Rock-shell (1.5") 4 cm
Thais speciosa (Valenciennes,
1832). W. Mexico to Peru. Inter-
tidal rocks; common. Syn.: *tri-*
serialis Blainville.



Kiosque Rock-shell (2") 5 cm
Thais kiosquiformis (Duclos,
1832). W. Mexico to Peru. Man-
grove and oyster areas; com-
mon.



Blanford's Rock-shell
(0.8") 2 cm
Thais blanfordi (Melvill, 1893).
Northern Indian Ocean; Per-
sian Gulf. Intertidal; common.



Belligerent Rock-shell (3")
7.5 cm *Thais armigera* (Link,
1807). Southwestern Pacific.
Rock shores; common. Syn.:
armigera Lamarck.



Prickly Rock-shell (1.5") 4 cm
Thais echinata (Blainville,
1832). Southwestern Pacific.
Littoral; common. Rare umbili-
cate.



Mancinella Rock-shell (2") 5 cm
Thais mancinella (L., 1758).
Southwestern Pacific; Austra-
lia. Intertidal rocks; common.



Coronate Rock-shell (1.5") 4 cm
Thais coronata (Lamarck, 1816).
Senegal to Congo; Trinidad to
Brazil. Mangroves and rocks;
common.



Rustic Rock-shell (1.5") 4 cm
Thais rustica (Lamarck, 1822).
S.E. Florida to Brazil. Littoral;
common. Syn.: *undata* of
authors.



Rugose Rock-shell (1") 2.5 cm
Thais rugosa (Born, 1778).
Southeastern Asia; India. Rock
and mud areas; common. Alias
sacellum (Gmelin, 1791).



Basket Drupe (1") 2.5 cm
Morula funiculus (Wood, 1828).
Southwestern Pacific. Littoral
rocks; common. Syn.: *triangu-*
lata Pease; *decussata* Reeve.



Grape Drupe (0.5") 1.2 cm
Morula uva (Röding, 1798).
Tropical W. Pacific. Intertidal
rocks; common. Syn.: *nodus*
Lamarck.



Monodon Thorn Drupe (1.5") 4 cm *Acanthina monodon* (Pallas, 1774). Peru to Argentina. Rocky shores; common. Syn.: *calcar* Martyn; *unicornis* Bruguière.



Rough Thorn Drupe (1.5") 4 cm *Acanthina monodon* form *imbricata* Lamarck, 1816. Chile; Falkland Islands. Common.



Grand Purpura (2.5") 6 cm *Neorapana grandis* (Sowerby, 1835). Galapagos Islands. Locally common.



Gloomy Thorn Drupe (1") 2.5 cm *Acanthina lugubris* (Sowerby, 1821). Southern California and western Mexico. Littoral rocks; abundant.



Spotted Thorn Drupe (1") 2.5 cm *Acanthina punctulata* (Sowerby, 1825). Monterey, California, to Baja California. Upper intertidal zone; common.



Short-toothed Thorn Drupe (1") 2.5 cm *Acanthina brevidentata* (Wood, 1828). W. Mexico to Peru. Littoral; common.



Checked Thorn Drupe (1") 2.5 cm *Acanthina paucilirata* (Stearns, 1871). San Pedro, California, to Baja California. Littoral; common.



Convolute False Triton (1") 2.5 cm *Phyllocoma convoluta* (Broderip, 1843). Southwestern Pacific. Offshore; rare.



Scaled False Triton (1.2") 3 cm *Phyllocoma scalariformis* (Broderip, 1833). W. Mexico to Panama; Galapagos. Intertidal; uncommon.



Bezoar Rapa Whelk (3") 7.5 cm *Rapana bezoar* (L., 1758). Japan to southeastern Asia. Offshore; moderately common.



Turnip-shaped Rapa (3.5") 9 cm *Rapana rapiformis* (Born, 1778). Southeastern Asia and East Indies. Common. Syn.: *bulbosa* Lightfoot.



Thomas's Rapa Whelk (4") 10 cm *Rapana venosa* (Valenciennes, 1846). Japan; China; introduced to Black Sea. Common. Syn.: *thomasi* Crosse.



Wreath Jopas (2") 5 cm
Nassa sarta (Bruguière, 1789).
Southwestern Pacific to Ha-
wahi. Intertidal rocks; com-
mon.



Francolina Jopas (2") 5 cm
Nassa francolina (Bruguière,
1789). Indian Ocean. Common.
Smoothish.



Yellow Jopas (1") 2.5 cm
Pinaxia coronata A. Adams,
1851. Philippines to Japan. Shal-
low water. Japan form without
stripes (*citrina* Kuroda).



Ribbioned Jopas (1") 2.5 cm
Vexilla taeniata (Powis, 1835).
Central Pacific. Uncommon.



Vexillate Jopas (1") 2.5 cm
Vexilla vexillum (Gmelin, 1791).
Indo-Pacific. Shore rocks; un-
common. Syn.: *picta* Swain-
son.



Lined Jopas (1") 2.5 cm
Vexilla lineata (A. Adams, 1853).
Southwestern Pacific to Ha-
wahi. Littoral; common. Syn.:
striatella Garrett.



Prickly Pacific Drupe
(1") 2.5 cm
Drupa ricinus (L., 1758). Indo-
Pacific. Intertidal rocks; abun-
dant.



Elegant Pacific Drupe (1")
2.5 cm *Drupa elegans* (Broderip
& Sowerby, 1829). Central Po-
lynesia. Intertidal rocks; un-
common.



Purple Pacific Drupe (1") 2.5 cm
Drupa morum Röding, 1798.
Indo-Pacific. Intertidal reefs;
common. Syn.: *horrida* La-
marck.



Iodine-mouth Drupe (1.2") 3 cm
Drupa morum subspecies
iodostoma (Lesson, 1840). Mar-
quesas Islands; eastern Polyne-
sia. Uncommon.



Digitate Pacific Drupe (1")
2.5 cm *Drupa grossularia* (Röd-
ing, 1798). S.W. Pacific to east-
ern Polynesia. Shallow water;
common. Syn.: *digitata* La-
marck.



Lobate Drupe (1") 2.5 cm
Drupa lobata (Blainville, 1832).
Red Sea to western Australia.
Shallow water; locally com-
mon.



Strawberry Drupe (1.5") 4 cm
Drupa rubusidaeus Röding, 1798. Indo-Pacific. Lower intertidal reefs; uncommon. Syn.: *fragum* Röding.



Clathrate Drupe (1.5") 4 cm
Drupa clathrata (Lamarck, 1816). S.W. Pacific. Intertidal. Widespread but uncommon. Syn.: *rubuscaesius* of authors.



Giant Forreria (5") 13 cm
Forreria belcheri (Hinds, 1843). California to Baja California. Intertidal oyster bars; common.



Lee's Murex (3.5") 9 cm
Calcitrapessa leeana (Dall, 1890). W. Mexico. 50 to 100 m; uncommon. Holotype illustrated.



Cerros Trophon (3") 7.5 cm
Austrotrophon cerrosensis form *pinnatus* (Dall, 1902). W. Mexico. 50 to 150 m; rare. Holotype.



Catalina Trophon (3") 7.5 cm
Austrotrophon cerrosensis subspecies *catalinensis* Oldroyd, 1927. South third of California. Offshore; rare.



Gorgon Trophon (1.3") 3 cm
Boreotrophon gorgon (Dall, 1913). Off Hondo, Japan. 300 m; rare. Holotype illustrated.



Thistle Trophon (1.3") 3 cm
Enixotrophon carduelis (Watson, 1886). Off eastern Australia. 800 m; rare.



Prickly Trophon (1.3") 3 cm
Nipponotrophon echinus (Dall, 1918). Sagami, Japan. Deep water; uncommon.



Clavate Trophon (1.3") 3 cm
Trophonopsis clavatus (G. O. Sars, 1879). N.W. Europe; east Canada to off North Carolina. Deep water; uncommon.



Carinate Trophon (1.3") 3 cm
Trophonopsis vaginatus (Cristofori & Jan, 1832). Mediterranean. Deep water. Syn.: *carinatus* Bivona.



Watson's Trophon (2.2") 6 cm
Trophonopsis acanthodes (Watson, 1882). Off southeastern South America. Deep water; rare.



Alaska Trophon (1.3") 3 cm
Boreotrophon alaskanus (Dall, 1902). Japan and Alaska. Deep water; uncommon.



Dall's Trophon (2") 5 cm
Nodulotrophon dalli (Kobelt, 1878). Northern Pacific. Deep water; rare.



Lacinate Trophon (2") 5 cm
Stramonitrophon plicatus (Lightfoot, 1786). Southern South America. Offshore; common. Syn.: *laciniatus* Martyn.



Candelabrum Trophon (1.5") 3.5 cm
Boreotrophon candelabrum (Reeve, 1848). Japan. Deep water; uncommon.



Gevers's Trophon (4") 10 cm
Trophon geversianus (Pallas, 1774). Southern South America. Offshore; common. Syn.: *magellanicus* Lamarck.



Gevers's Trophon (4") 10 cm
Trophon geversianus (Pallas, 1774). A very variable species with many intergrades.



Northwest Pacific Trophon (1") 2.5 cm
Boreotrophon pacificus (Dall, 1902). Bering Sea to California. Offshore in south; intertidal in north. Common.



Stuart's Trophon (1.5") 4 cm
Boreotrophon stuarti (E. A. Smith, 1880). Alaska to California. Subtidal to 50 m; common. Holotype illustrated.



Truncate Trophon (0.6") 1.5 cm
Boreotrophon truncatus (Ström, 1768). Northwestern Europe; Greenland. Offshore in 4 to 140 m; common.



Triangular Trophon (1.2") 3 cm
Boreotrophon triangulatus (Carpenter, 1864). California. Offshore; moderately common.



Clathrate Trophon (0.6") 1.5 cm
Boreotrophon clathratus (L., 1758). Arctic seas to W. Europe. Offshore; common. Syn.: *gunneri* Loven.



Sandpaper Trophon (2") 5 cm
Trophonopsis lasius (Dall, 1919). Bering Sea to off Baja California. 50 to 1,000 m; common.



Elongate Trophon (1.5") 4 cm
Trophon elongatus Strebel, 1904. Magellan Straits; Falkland Islands. Offshore; uncommon.



Hoyle's Trophon (1.2") 3 cm
Trophon hoylei Strebel, 1904. Falkland Islands. Offshore; uncommon.



Ambiguous Trophon (1.5") 4 cm
Zeatrophon ambiguus (Philippi, 1844). New Zealand. Shallow water; common.



Broderip's Thistle Trophon (1") 2.5 cm
Acanthotrophon carduus (Broderip, 1833). W. Mexico to Peru. Subtidal; uncommon.



Panama Thistle Trophon (1.5") 4 cm
Austrotrophon panamensis Olsson, 1971. Gulf of Panama. Deep water; rare. Holotype illustrated.



Beebe's Trophon (1.5") 3.5 cm
Trophon beebei Hertlein & Strong, 1948. Gulf of California. 60 to 120 m; moderately common.



Yellow-mouth Trophon (2.5") 6 cm
Xanthochorus xanthostoma (Broderip, 1833). Panama to Chile. Offshore; common. Syn.: *horridus* Brod.



Fimbriate False Latiaxis (1.5") 4 cm
Latiaxis fimbriata (Hinds, 1844). N.W. Pacific; Japan. Shallow water; common. Syn.: *imbricatus* Smith.



Mawe's Latiaxis (2") 5 cm
Latiaxis mawae (Griffith & Pidgeon, 1834). Japan. Offshore; locally common. Family Coralliophilidae.



Winding Latiaxis (2") 5 cm
Latiaxis tortilis H. & A. Adams, 1863. South Africa. Offshore; uncommon.



Gyrate Latiaxis (2") 5 cm
Latiaxis gyratus (Hinds, 1844). Southwestern Pacific. Offshore; uncommon. Also Japan.



Eugenia's Latiaxis (2") 5 cm
Latiaxis idoleum Jonas, 1847. Japan. Offshore; uncommon. Syn.: *eugeniae* Bernardi.



Japanese Latiaxis (1") 2.5 cm
Latiaxis japonicus (Dunker, 1882). Japan. Offshore, 30 to 200 m; common.



Armored Latiaxis (1") 2.5 cm
Latiaxis armatus Sowerby, 1912. Japan. Offshore; common.



Purple-mouth Latiaxis (1.5") 4 cm
Latiaxis purpuratus Chenu, 1859. Eastern Asia; Japan. Offshore; uncommon.



Carinate Latiaxis (1.5") 4 cm
Latiaxis purpuratus form *cariniferoides* Shikama, 1966. Japan. Offshore, 100 m; uncommon.



DeBurgh's Latiaxis (1.5") 4 cm
Latiaxis deburghiae (Reeve, 1857). Eastern Asia; southern Japan; 20 to 150 m; uncommon.



Lischke's Latiaxis (1.5") 4 cm
Latiaxis lischkeana (Dunker, 1882). Japan to off New Zealand. Deep water; common. Syn.: *australis* Laseron.



Dunker's Latiaxis (1.5") 4 cm
Latiaxis dunkeri Kuroda & Habe, 1961. Japan. Deep water; moderately common.



Kira's Latiaxis (1") 2.5 cm
Latiaxis kiranus Kuroda, 1959. Japan. Deep water; moderately common.



Takahashi's Latiaxis (1.5") 3.5 cm
Latiaxis takahashii Kosuge, 1979. Cebu Island, Philippines. 100 m; uncommon.



Cristate Latiaxis (1") 2.5 cm
Latiaxis cristatus Kosuge, 1979. Cebu Island, Philippines. 100 m; uncommon.



Bushy Latiaxis (1.2") 3 cm
Latiaxis fruticosus Kosuge, 1979. Off Cebu Island, Philippines. 80 to 100 m; uncommon.



Prickly Latiaxis (1") 2.5 cm
Latiaxis echinatus Azuma, 1960. Off Tosa, Japan. 200 m; uncommon.



Santa Cruz Latiaxis (1.5") 3.5 cm
Latiaxis santacruzensis Emerson & D'Attilio, 1970. Galapagos Islands. 150 m; rare.



Julia's Latiaxis (0.8") 2 cm
Latiaxis juliae Clench & Aguayo, 1939. Off Barbados, West Indies. 150 to 300 m; very rare.



Hinds's Latiaxis (1.5") 3.5 cm
Latiaxis hindsii (Carpenter, 1857). W. Mexico to Panama; Galapagos. Offshore; uncommon.



Costate Latiaxis (1") 2.5 cm
Latiaxis costatus (Blainville, 1832). W. Mexico to Panama. Intertidal rocks; fairly common.



Pilsbry's Latiaxis (1.5") 3.5 cm
Latiaxis pilsbryi Hirase, 1908. Japan. Offshore; rare.



Winckworth's Latiaxis (1.5") 3.5 cm
Latiaxis winckworthi Fulton, 1930. Japan. Shallow water; moderately common.



Lamellose Coral-shell (1") 2.5 cm
Coralliophila meyendorffi (Calcar, 1845). Mediterranean. Common. Form *lamellosa* Phil., 1836.



Pyriform Coral-shell (1.5") 3.5 cm
Coralliophila pyriformis Kira, 1959. Japan. Offshore; uncommon.



Violet Coral-shell (1.5") 3.5 cm
Coralliophila neritoidea (Lamarck, 1816). Indo-Pacific. Shallow reefs; common. Syn.: *violacea* Kiener.



Isshiki Coral-shell (1") 2.5 cm
Coralliophila isschikiensis Shikama, 1971. Japan. Offshore; uncommon.



Fearnley's Coral-shell (2") 5 cm
Coralliophila fearnleyi (Emerson & D'Attilio, 1965). Japan to Australia.



South Seas Coral-shell (1") 2.5 cm
Coralliophila erosa (Röding, 1798). Indo-Pacific. Subspecies *bulbiformis* Conrad, 1837, from Hawaii.



Spinose Latiaxis (1") 2.5 cm
Latiaxis pagodus form *spinosa* Hirase, 1908. Japan; common. At right: form *multi-spinosa* Shikama, 1966.



Pagoda Latiaxis (1") 2.5 cm
Latiaxis pagodus (A. Adams, 1852). Japan. Offshore. Common. Very variable.



Dall's Latiaxis (1.5") 3.5 cm
Latiaxis dalli Emerson & D'Attilio, 1963. Caribbean. Deep water; rare.



Mactan Latiaxis (1.5") 3.5 cm
Latiaxis mactanica Kosuge, 1979. Off Mactan Island, Philippines. 100 m; uncommon.



Rose Latiaxis (1.5") 3.5 cm
Latiaxis sentis (F. M. Bayer, 1971). Caribbean. Deep water; rare.



Short Coral-shell (1.5") 3.5 cm
Coralliophila abbreviata (Lamarck, 1816). S.E. Florida to Brazil. Bases of sea fans and on corals. Common.



Wide-spined Latiaxis (1.2") 3 cm
Latiaxis latipinnatus Azuma, 1961. Japan to central Philippines. 150 to 225 m; uncommon. Umbilicate.



Caribbean Coral-shell (1") 2.5 cm
Coralliophila caribaea Abbott, 1958. S.E. United States to Brazil. In holdfasts of sea fans; common. Syn.: *plicata* of authors.



Aberrant Coral-shell (1") 2.5 cm
Coralliophila aberrans (C. B. Adams, 1850). Eastern United States to Brazil. Deep water; uncommon.



Small Coral-shell (1") 2.5 cm
Coralliophila parva (E. A. Smith, 1877). Galapagos Islands; Gulf of California. Shallow water; uncommon.



Quoy's Coral-shell (1") 2.5 cm
Quoyula madreporarum (Sowerby, 1832). Indo-Pacific. On corals; common.



Burrowing Coral-shell (6") 15 cm
Magilus antiquatus Montfort, 1810. Indo-Pacific. Bores into brain coral. Early whorls filled in. Uncommon.



Rapa Snail (2.5") 6 cm
Rapapapa (L., 1758). Southwestern Pacific. Buried inside soft, yellow coral. Locally common.



Genka Snail (1.5") 4 cm
Genkaimurex varicosus (Kuroda, 1953). Genkai Sea, Japan. Offshore; uncommon.



Pavlova Typhis (1.5") 4 cm
Trubatsa pavlova (Iredale, 1936). Southeastern Australia. 100 to 220 m; uncommon.



Sowerby's Typhis * (0.8") 2 cm
Typhis sowerbii Broderip, 1833. Caribbean and Mediterranean. Offshore; Uncommon.



Pinnate Typhis (0.8") 2 cm
Pterotyphis pinnatus (Broderip, 1833). Bahamas and Caribbean. Shallow water; uncommon.



Triangular Typhis (1.5") 4 cm
Tripterotyphis triangularis (A. Adams, 1855). Bahamas and Caribbean. Shallow reefs; rare.



Clery's Typhis (0.8") 2 cm
Typhina cleryi (Petit, 1840). Brazil and Western Africa. Moderately deep water; uncommon.



Bullis's Typhis (1") 2.5 cm
Siphonochelus bullisi Gertman, 1969. Lower Caribbean. Deep water; rare. Holotype illustrated.



Cuming's Typhis (1.2") 3 cm
Haustellotyphis cumingii (Broderip, 1833). W. Mexico to Ecuador. Shallow water; fairly common.



Angus's Typhis (0.8") 2 cm
Protyphis angasi (Crosse, 1863). S.E. Australia; New Zealand. Intertidal; locally common. Syn.: *eos* Hutton.



Fay's Typhis (1.2") 3 cm
Tripterotyphis fayae (Keen & Campbell, 1964). Western Mexico. Shallow water; uncommon.



Coronate Typhis (1.2") 3 cm
Typhisopsis coronatus (Broderip, 1833). W. Mexico to Ecuador. Shallow water; uncommon; worn specimen here.



Philippine Typhis (0.8") 2 cm
Typhina philippensis (Watson, 1883). Southwestern Pacific; Australia. Offshore; uncommon. Syn.: *interpres* Iredale.



Yates's Typhis (0.8") 2 cm
Typhina yatesi (Crosse & Fischer, 1865). Southern Australia; Victoria. Offshore; uncommon.



Grand Typhis (1.3") 3.5 cm
Typhisala grandis (A. Adams, 1855). W. Mexico to Panama. Offshore; uncommon.

PAGODA SHELLS FAMILY COLUMBARIIDAE

A small group of rare, deep-water species found throughout the world. The small shells have a very long siphonal canal. Spines occur on the shoulders of the whorls. The nuclear whorls are bulbous. Operculum chitinous. One genus, *Coluzea*, is limited to the region of New Zealand. The family has fewer than 30 living species.



First Pagoda Shell (2.5") 6 cm
Columbarium pagoda (Lesson, 1831). Japan. Offshore; common. Syn.: *costatum* Shikama; *stellatum* Habe.



False Pagoda Shell (3") 7.5 cm
Columbarium pagodoides (Watson, 1882). Southeastern Australia. 1,200 m; rare. Paratype illustrated.



Spiny Pagoda Shell (2") 5 cm
Columbarium spinicinctum (von Martens, 1881). Eastern Australia. Offshore, 50 to 130 m; uncommon.



Most Graceful Pagoda (2") 5 cm
Columbarium formosissimum Tomlin, 1928. Off South Africa in 200 m; uncommon.



Bray's Pagoda Shell (2.5") 6 cm
Columbarium brayi Clench, 1959. Southern Caribbean. 300 m; rare.



Atlantic Pagoda Shell (1") 2.5 cm
Columbarium atlantis Clench & Aguayo, 1938. Off northern Cuba. 500 to 700 m; rare. Holotype illus.



Bartlett's Pagoda Shell (1.5") 4 cm
Columbarium bartletti Clench & Aguayo, 1940. Caribbean. 300 to 600 m; rare. Holotype illus.



Bermudez's Pagoda Shell (1") 2.5 cm
Columbarium bermudezi Clench & Aguayo, 1938. Off Florida; Cuba. Deep water; rare. Holotype.

DOVE-SHELLS
FAMILY COLUMBELLIDAE

Large family of numerous genera and many species living in warm and tropical waters. Some dove-shells are tiny, few exceed an inch. Scavenging carnivores, they are especially active at night when they may be seen in sandy and muddy places at low tide. The family (which is also called Pyrenidae) is well represented in tropical waters.



Lance Strombina (1.2") 3 cm
Strombina lanceolata (Sowerby, 1832). Ecuador, Galapagos. Offshore; uncommon.



Recurved Strombina (1.2") 3 cm
Strombina recurva (Sowerby, 1832). Baja California to Peru. Offshore to 37 m; common. Syn.: *limonetta* Li.



Mrs. Deroy's Strombina (2") 5 cm
Strombina deroyae Emerson & D'Attilio, 1969. Galapagos Islands. 150 m; uncommon.



Blotchy Strombina (1") 2.5 cm
Strombina maculosa (Sowerby, 1832). Gulf of California to Panama. On offshore mud flats to 37 m; common.



Slender Strombina (2") 5 cm
Strombina fusinoidea Dall, 1916. Baja California to Panama. Offshore; uncommon. Syn.: *fusiformis* Hinds.



Slender Strombina (2") 5 cm
Strombina fusinoidea Dall, 1916. Resembles *S. recurva* but has more rounded shoulder and lacks shoulder tubercles.



Turret Strombina (1.4") 3.5 cm
Strombina turrita (Sowerby, 1832). Guatemala to Ecuador. Offshore at about 25 m; uncommon.



Humped Strombina (1") 2.5 cm
Strombina dorsata (Sowerby, 1832). Gulf of California to Ecuador. Offshore at 37 m; uncommon.



Peacock Strombina (0.8") 2 cm
Strombina pavonina (Hinds, 1844). W. Mexico to Panama. Offshore to about 37 m; uncommon.



Shouldered Strombina (1.2") 3 cm
Strombina angularis (Sowerby, 1832). W. Mexico to Panama. Offshore to 37 m; uncommon. Syn.: *subangularis* Lowe.



Caribbean Strombina (.7") 1.8 cm
Strombina pumilio (Reeve, 1859). Venezuela and Isla Margarita. Offshore; moderately common.



Stromboid Dove-shell (1.2") 3 cm
Columbella strombiformis Lamarck, 1822. Gulf of California to Peru. Under intertidal rocks; common. Syn.: *bridgesii* Reeve.



Blood-stained Dove-shell (1") 2.5 cm
Columbella haemastoma Sowerby, 1832. Gulf of California to Ecuador, Galapagos. Under intertidal rocks; moderately common.



Fat Dove-shell (1") 2.7 cm
Columbella major Sowerby, 1832. Gulf of California to Peru. Under intertidal rocks; moderately common.



Big-lip Dove-shell (0.9") 2.2 cm
Columbella labiosa Sowerby, 1822. Nicaragua to Ecuador. On exposed rocks; common. Syn.: *venilia* Duclos.



Rough Dove-shell (0.8") 2 cm
Anachis rugosa (Sowerby, 1832). Nicaragua to Ecuador. Exposed rocks, mud flats; common. Syn.: *bicolor* Kiener.



Payta Dove-shell (1") 2.5 cm
Columbella paytensis Lesson, 1830. Ecuador to Peru, Galapagos. Intertidal; moderately common.



Burnt Dove-shell (0.8") 2 cm
Columbella fuscata Sowerby, 1832. Baja California to Peru. Intertidal; moderately common.



Varia Dove-shell (0.8") 2 cm
Anachis varia (Sowerby, 1832). W. Mexico to Panama. Intertidal; common. Syn.: *veleda* Duclos.



Zigzag Dove-shell (0.7") 1.8 cm
Anachis fluctuata (Sowerby, 1832). Nicaragua to Ecuador. Intertidal; common. Syn.: *costata* Duclos.



Cone-shaped Dove-shell (1") 2.5 cm
Parametaria philippinarum (Reeve, 1843). Philippines, Indonesia. Intertidal; uncommon. Syn.: *coniformis* Sowerby.



Dupont's Dove-shell (1") 2.7 cm
Parametaria dupontii (Kiener, 1849). Gulf of California, W. Mexico. Shallow water; moderately common.



Common Dove-shell (0.8") 2 cm
Columbella mercatoria (L., 1758). Florida to Brazil, Bermuda. Under rocks, shallow water; common. Many synonyms.



Smooth Dove-shell (0.8") 2 cm
Nitidella laevigata (L., 1758). Florida Keys, W. Indies, Bermuda. Shallow water; common. Outer lip smooth.



Rustic Dove-shell (1.2") 3 cm
Columbella rustica (L., 1758). Mediterranean to W. Africa. Shallow water; common. Many synonyms.



Rusty Dove-shell (0.4") 1 cm
Columbella rusticoides Heilprin, 1887. S. Florida; N.W. Cuba. Subtidal to 10 m; common.



Cone Dove-shell (1") 2.5 cm
Parametaria epamella (Duclos, 1846). Philippines. Intertidal; uncommon.



Yellow Dove-shell (1") 2.5 cm
Pyrene flava (Bruguière, 1789). Indo-Pacific. Subtidal; common. Very variable color and pattern.



Music Dove-shell (0.6") 1.5 cm
Mitrella scripta (L., 1758). Mediterranean. Offshore and beached; common. Syn.: *flaminea* Risso.



Lightning Dove-shell (0.8") 2 cm
Pyrene ocellata (Link, 1807). Indo-Pacific. Shallow water; common. Syn.: *fulgurans* Lamarck.



Telescoped Dove-shell (1") 2.5 cm
Pyrene punctata (Bruguière, 1789). Indo-Pacific. Offshore and beached; moderately common. Syn.: *torva* Dillwyn.



Bound Dove-shell (0.5") 1.2 cm
Dentimitrella vincta (Tate, 1893). Southern Australia, Tasmania. Offshore; common.



Harp Dove-shell (0.5") 1.2 cm
Microcithara harpiformis (Sowerby, 1832). W. Central America. Intertidal; uncommon.



San Felipe Dove-shell (0.3") 7 mm
Anachis sanfelipensis Lowe, 1935. North end of Gulf of California. Intertidal; uncommon.



Dotted Dove-shell (0.7") 1.8 cm
Pyrene versicolor (Sowerby, 1832). Indo-Pacific. Subtidal; common.

NEPTUNES, WHELKS AND
ALLIES
FAMILY BUCCINIDAE

This is a very large and diverse family having many genera represented both in polar seas as well as the tropics. The fusiform shells may be drab in the cold seas and colorful in the tropics. Most have a large, horny, oval operculum. Hundreds of species are known.



Norwegian Volute Whelk

(5") 12 cm

Volutopsius norvegicus (Gmelin, 1791). North Atlantic, North Sea. 90 to 250 m; common. Syn.: *norvegicus* Chemnitz.



Norwegian Volute Whelk

(5") 12 cm

Volutopsius norvegicus (Gmelin, 1791). *V. largillierii* Petit is also a synonym.



Chestnut Volute Whelk

(3.5") 9 cm

Volutopsius castaneus (Mörch, 1858). N. Japan to Alaska. Offshore; common.



Middendorff's Volute Whelk

(3.5") 9 cm

Volutopsius middendorffi Dall, 1891. Arctic Seas, Bering Sea. Offshore; common.



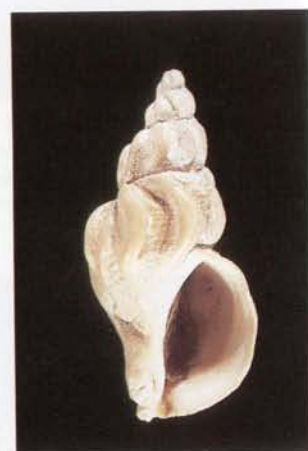
Sinistral Arctic Whelk (3")

7.5 cm *Pyrolofusus deformis* (Reeve, 1847). Bering Sea, Japan and Alaska. Offshore; common. Syn.: *harpa* Mörch.



Bering's Neptune (3") 7.5 cm

Beringion behringii (Middendorff, 1848). Bering Sea. Uncommon. (*beringii* is misspelling.) Formerly in *Beringius*.



Kennicott's Neptune (3.5") 9 cm

Beringion kennicottii (Dall, 1907). Alaska, Japan. Offshore; uncommon.



Marshall's Neptune (4") 10 cm

Beringion marshalli (Dall, 1919). Japan; Bering Sea. Offshore; rare.



Turton's Neptune (3") 7.5 cm

Neoberingius turtoni (Bean, 1834). Circum-arctic Seas. Offshore; uncommon.



Spitzbergen Colus (3") 7.5 cm

Colus spitzbergeni (Reeve, 1855). Northern Norway, Siberia. Offshore; uncommon.



Herendeen Colus (2.5") 6.5 cm

Colus herendeeni (Dall, 1902). Alaska. Offshore, 80 to 600 m; rare.



Near Colus (1.5") 3.5 cm
Colus howsei (Marshall, 1911).
Western Europe. 35 to 170 m;
common. Syn.: *propinquus*
Adler, not Muenster.



Iceland Colus (3.5") 9 cm
Colus islandicus (Gmelin,
1791). Labrador to Norway. Off-
shore, 2 to 100 m; common.



Jeffreys's Colus (2.5") 6 cm
Colus jeffreysianus (Fischer,
1868). W. Europe. Offshore to
300 m; uncommon.



Stimpson's Colus (4") 10 cm
Colus stimpsoni (Mörch, 1867).
Labrador to off North Carolina.
Common. Syn.: *brevis* Verrill.



Twisted Colus (2.5") 6 cm
Colus tortuosus (Reeve, 1855).
Arctic Europe. 27 to 500 m; un-
common.



Ventricose Colus (2") 5 cm
Colus ventricosus (Gray, 1839).
Nova Scotia to off Maine. 10 to
100 m; uncommon.



Slender Colus (2.5") 6.5 cm
Colus gracilis (da Costa, 1778).
W. Europe. Offshore to 800 m;
common.



Turgid Colus (2.4") 6 cm
Colus turgidulus (Friele, 1877).
W. Europe. Deep water; rare.



Fusiform Colus (1.6") 4.5 cm
Siphonorbis fenestratus (Tur-
ton, 1834). North Atlantic. 72 to
262 m; uncommon. Syn.: *fusi-*
formis Broderip, not Borson.



Ivory Colus (3") 7.5 cm
Siphonorbis ebur (Mörch,
1869). N.W. Europe. Cold seas,
deep water; uncommon.



Destiny Colus (1.8") 4.5 cm
Turrisipho lachesis (Mörch,
1869). Northern Norway. Off-
shore; uncommon.



Plicate Colus (1.5") 4 cm
Plicifusus plicatus (A. Adams,
1863). Japan. Cold water. Off-
shore; common.



Kroyer's Colus (3") 7.5 cm
Plicifusus kroyeri (Möller, 1842). Circumpolar seas; Greenland; Bering Sea. Common.



Grammatus Whelk (4") 10 cm
Ancistrolepis grammatus (Dall, 1907). Off Yesso, Japan. Rare. Holotype illustrated.



Unicum Whelk (3") 7.5 cm
Clinopegma unicum (Pilsbry, 1905). Japan. Form *polygramma* Dall, 1907, has spiral cords.



Magna Whelk (3") 7.5 cm
Clinopegma magnum (Dall, 1895). Japan, cold water. 90 to 140 m. Uncommon.



Broad Japelon (3.5") 9 cm
Japelon latus (Dall, 1918). Korean Straits; East China Sea. Uncommon.



Peri Japelon (4") 10 cm
Japelon pericochlion (Schrenck, 1862). Off Hokkaido, Japan. Deep water. Common.



Adelphic Japelon (3") 8 cm
Japelon adelphicus (Dall, 1907). Tosa Bay, Shikoku, Japan. Common.



Hirase's Japelon (4") 10 cm
Japelon hirasei (Pilsbry, 1901). Hokkaido, Japan. Offshore; common.



Ovum Arctic Whelk (1.5") 4 cm
Liomesus dalei (Sowerby, 1825). N.W. Europe. Offshore, 72 to 180 m; common. Syn.: *ovum* Turton.



Ancient Neptune (6") 15 cm
Neptunea antiqua (L., 1758). Western Europe to Scotland. Offshore to 1,000 m; common.



Fat Neptune (4") 10 cm
Neptunea ventricosa form *beh-ringiana* (Middendorff, 1848). Bering Sea. Offshore; common.



Rejected Neptune (6") 15 cm
Neptunea despecta (L., 1758). Arctic Seas. Offshore; common.



Double Sculptured Neptune (4") 10 cm
Neptunea intersculpta (Sowerby, 1899). Arctic Seas; Japan. Offshore; uncommon.



Brother Neptune (4") 10 cm
Neptunea intersculpta form *frater* Pilsbry, 1901. Japan. Offshore. One of several forms.



Pribiloff Neptune (4") 10 cm
Neptunea intersculpta form *pribiloffensis* (Dall, 1919). One of several variations.



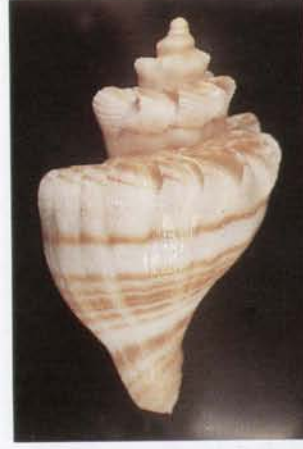
Clench's Neptune (4") 10 cm
Neptunea despecta subspecies *clenchi* Clarke, 1956. N. Canada. Holotype illus.



Ithia Neptune (4") 10 cm
Neptunea ithia (Dall, 1891). W. Canada to California. Offshore to 800 m; uncommon.



Smirna Neptune (3") 7.5 cm
Neptunea smirnia (Dall, 1919). Alaska to Washington. 100 to 300 m; common. Syn.: *fukuiae* Kira.



Arthritic Neptune (4") 10 cm
Neptunea arthritica (Bernardi, 1857). N.E. China; Korea. 4 to 50 m; locally common.



Arthritic Neptune (4") 10 cm
Neptunea arthritica (Bernardi, 1857). A very variable species. Syn.: *cumingii* Crosse.



Fat Neptune (4") 10 cm
Neptunea ventricosa (Gmelin, 1791). Arctic Seas; Bering Sea. Common. Syn.: *satura* Martyn.



Tabled Neptune (3") 7.5 cm
Neptunea tabulata (Baird, 1863). W. Canada to California. Offshore, 40 to 400 m; fairly common.



Heros Neptune (4") 10 cm
Neptunea heros (Gray, 1850). Arctic Seas; Japan. Uncommon. Syn.: *bulbacea* (Bernardi, 1808).



New England Neptune (3") 7.5 cm
Neptunea lyrata (Gmelin, 1791). Subspecies *decemcostata* (Say, 1826). New England. Offshore; common.



Left-handed Neptune (3.5") 9 cm
Neptunea contraria L., 1771. Mediterranean; Eastern Atlantic. Offshore to deep water; moderately uncommon.



Phoenician Whelk (4") 11 cm
Neptunea lyrata form *phoenicea* (Dall, 1891). Off W. Canada. Deep water; common.



Kinoshita's Whelk (2") 5 cm
Parancistrolepis kinoshitai (Kuroda, 1931). Japan. Offshore to 100 m; uncommon.



Fusiform Whelk (2.3") 6 cm
Siphonalia fusoides (Reeve, 1846). Japan. Moderately deep water; common. Sometimes has pale brown spots.



Knobbed Whelk (2") 5 cm
Austrofusus glans (Röding, 1798). New Zealand. On sand at low-tide level and below; common.



Waller's Whelk (3") 7.5 cm
Siphonofusus walleri (Ladd, 1976). Philippines; S.W. Pacific. Offshore to 100 m; rare.



Hooped Whelk (1.8") 4.5 cm
Siphonalia trochulus (Reeve, 1843). Japan. Common. May have tubercles on shoulders. Syn.: *tokaiensis* Kira, 1959.



Bonnet Whelk (1.5") 4 cm
Siphonalia cassidariaeformis (Reeve, 1843). Japan. Offshore; common. Extremely variable in form and color.



Funereal Whelk (1.5") 4 cm
Siphonalia cassidariaeformis form *funerea* Pilsbry, 1895. Japan. Offshore; common. Color variation only.



Pfeffer's Whelk (2") 5 cm
Siphonalia pfefferi Sowerby, 1900. Southern Japan. Dredged 10 - 60 m; common. *S. pfeifferi* is misspelling.



Pretty-zoned Whelk (2") 5 cm
Siphonalia callizona Kuroda & Habe, 1961. Japan. Offshore; 100 to 200 m; uncommon.



Kellet's Whelk (5") 12 cm
Kelletia kelleti (Forbes, 1850). California to Baja California; Japan. 2 to 80 m; common.



Delightful Phos (1") 2.5 cm
Phos gaudens Hinds, 1844. Gulf of California to Ecuador. Off-shore to 50 m; uncommon.



Grateloup's Phos (1") 2.5 cm
Phos grateloupianus Petit, 1853. West Africa; moderately common. Syn.: *ligatus* A. Adams.



Blue-mouth Phos (0.8") 2 cm
Phos cyanostoma A. Adams, 1850. Indian Ocean; S.E. Asia. Locally uncommon.



Articulate Phos (1.5") 4 cm
Phos articulatus Hinds, 1844. Gulf of California to Peru. Off-shore to 100 m; moderately common.



Magnificent Phos (2") 5 cm
Nassaria magnifica (Lischke, 1871). Southern Japan. Dredged 20 - 255 m; uncommon.



Solid Phos (1.5") 4 cm
Nassaria solida Kuroda & Habe, 1961. Japan to N.E. Australia. Dredged 100 to 600 m; rare. Paratype illustrated.



Indian Phos (1") 2.5 cm
Nassaria coromandelica E. A. Smith, 1894. Bay of Bengal. Deep water; rare.



Acuminate Phos (1") 2.5 cm
Nassaria acuminata (Reeve, 1844). Tropical Indo-W. Pacific. Subtidal; uncommon. Syn.: *bitubercularis* A. Adams.



White Phos (1") 2.5 cm
Nassaria pusilla (Röding, 1798). Southern and S.E. Asia. 1 to 20 m; uncommon. Syn.: *nivea* Gmelin.



Acapulco Trajana (1") 2.5 cm
Trajana acapulcana Pilsbry & Lowe, 1932. Gulf of Tehuantepec; W. Mexico. Taken by shrimpers; uncommon.



Round-mouth Trajana (1") 2.5 cm
Trajana perideris (Dall, 1910). W. Mexico. 37 to 55 m; uncommon.



Beau's Phos (1.5") 4 cm
Antillophos beau (Fischer & Bernardi, 1860). Yucatan; Cuba; Lesser Antilles. Dredged 10 - 185 m; moderately rare.



Flaring Penion (5") 13 cm
Penion cuvierianus (Powell, 1927). New Zealand. Deep water; common. Formerly *dilatatus* of authors. Syn.: *dispar* Powell; *rex* Finlay.



Waite's Penion (6") 15 cm
Berylsma waitei (Hedley, 1903). Southeastern Australia; Tasmania. Trawled in moderate depths; uncommon.



Mandarin Penion (5") 13 cm
Penion mandarina (Duclos, 1831). Southern Australia; Tasmania. Trawled or in crayfish pots; moderately common.



Ormes's Penion (7") 18 cm
Penion ormesi Powell, 1927. Central New Zealand. Dredged in deep water; uncommon.



Ornamented Penion (2.5") 6 cm
Aeneator comptus (Finlay, 1924). Northern New Zealand. Offshore; uncommon.



Common Pacific Phos (1.5") 4 cm
Phos senticosus (L., 1758). Indo-Pacific. Tidal sand and mud flats to 10 m; moderately common.



Woven Pacific Phos (1.2") 3 cm
Phos textum (Gmelin, 1791). Indo-W. Pacific. Shallow water in weedy coral-sand; moderately common.



Sharp-ribbed Phos (1.5") 3.5 cm
Phos muriculatus "Gould" Sowerby, 1859. Indo-W. Pacific; uncommon. Less sculptured than *P. senticosus*.



Basket Phos (1.4") 3.5 cm
Phos virgatus Hinds, 1844. Indian Ocean; Sri Lanka; shallow water in sand; rare.



Veragua Phos (1") 2.5 cm
Phos veraguensis Hinds, 1843. Gulf of California to Colombia. Offshore to considerable depths; moderately common.



Rosy Phos (1.5") 4 cm
Phos roseatus Hinds, 1844. Indo-W. Pacific. Moderately deep water in mud and coral debris; uncommon.



Hirase's Phos (1") 2.5 cm
Phos hirasei Sowerby, 1904. Southern Japan. Shallow water, subtidal in sand. Uncommon.



Checkerboard Engina (0.8") 2 cm
Engina alveolata (Kiener, 1836). Indo-Pacific. Shallow water; common. Syn.: *lauta* Reeve.



Curious Engina (1") 2.5 cm
Engina epidromidea Melvill, 1894. Bombay. Shallow water; uncommon.



Striped Engina (0.8") 2 cm
Engina mendicaria (L., 1758). Indo-Pacific. Under rocks in shallow water; common.



Mauritian Engina (0.6") 1.5 cm
Engina bonasia von Martens, 1880. Indian Ocean. Shallow water; uncommon.



Lovely Engina (0.8") 2 cm
Engina pulchra (Reeve, 1846). Panama to Ecuador. Under intertidal stones; uncommon.



Crested Engina (1") 2.5 cm
Engina jugosa (C. B. Adams, 1852). Gulf of California to Ecuador; Galapagos. Offshore to 37 m; uncommon.



Banded Engina (0.6") 1.5 cm
Engina zonalis (Lamarck, 1822). Tropical Indo-Pacific. Shallow water; common. Syn.: *zonata* Reeve.



North's Long Whelk (2") 5 cm
Northia pristis (Deshayes, in Lamarck, 1844). West Mexico to Ecuador. Shallow water; moderately common.



Dire Whelk (1.5") 3.5 cm
Searlesia dira (Reeve, 1846). Alaska to Monterey, California. On rocks at low tide; common.



Clarke's False Cominella (0.8") 2 cm
Tasmeuthria clarkei (Tenson-Woods, 1875). Australia; Tasmania. Shallow water; moderately common.



Speckled Whelk (2") 5 cm
Cominella adspersa (Bruguière, 1789). New Zealand. Sand flats and rocky ground. Solid shell.



Quoy's Whelk (0.8") 2 cm
Cominella quoyana (A. Adams, 1854). New Zealand. Rocky or sandy ground offshore; uncommon.



Basket Whelk (1.5") 4 cm
Cominella virgata H. & A. Adams, 1853. Northern New Zealand. On rocks in sheltered places; common.



Striped Burnupena (1.5") 4 cm
Burnupena papyracea form *tigrina* (Kiener, 1834). Cape Agulhas to East London, S. Africa. Rocky shores; common.



Girdled Burnupena (2") 5 cm
Burnupena papyracea form *cincta* (Röding, 1798). South Africa; Angola. Intertidal pools in crevices; common.



Spindle Euthria (2.3") 6 cm
Buccinum corneum (L., 1758). Mediterranean. Off-shore to 30 m; uncommon. A thick solid shell.



Large Lined Whelk (1.5") 4 cm
Buccinum lineum (Martyn, 1784). Northern New Zealand. Intertidal stones; common. Variable.



Powell's Lined Whelk (2") 5 cm
Buccinum pallidum Finlay, 1928, form *powelli* Ponder, 1971. New Zealand. Intertidal rocks; uncommon.



Truncate Pisania (0.8") 2 cm
Pisania truncata (Hinds, 1844). Japan; tropical Pacific. Shallow water; moderately common. Usually lacks early whorls.



Flame Pisania (1.5") 4 cm
Pisania ignea (Gmelin, 1791). Tropical Indo-Pacific. Shallow water; common. Syn.: *flammatum* Quoy & Gaimard.



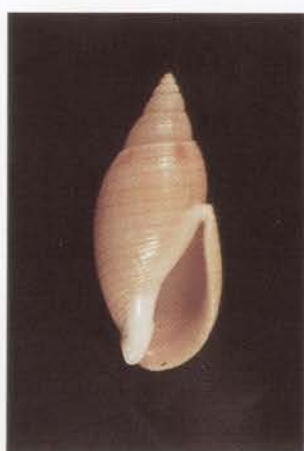
Tinted Pisania (1") 2.5 cm
Pisania tinctoria (Conrad, 1846). S.E. United States and West Indies. Intertidal and offshore; moderately common.



Miniature Triton Trumpet (1.2") 3 cm
Pisania pusio (L., 1758). S.E. Florida, W. Indies; Brazil; Bermuda. Shallow water; moderately common.



Striate Pisania (1.2") 3 cm
Pisania striata (Gmelin, 1791). Mediterranean; Azores. Intertidal rocks; common. Syn.: *maculosa* Lamarck.



Brown-lined Truncaria (1.2") 3 cm
Truncaria brunneocincta (Dall, 1896). Panama. Dredged at 100 m; rare. Holotype illustrated.



Cuming's Metula (1.5") 3.7 cm
Metula cumingii A. Adams, 1853. West Africa (Senegal). Shallow water; uncommon.



Pink Metula (1.5") 3.8 cm
Metula amosi Vanatta, 1913. Panama. Offshore in moderately deep water; uncommon.



Banded Pisanina (1.1") 3 cm
Appisania fasciculata (Reeve, 1848). Philippines; S.W. Pacific. Shallow reefs; uncommon.



Hazel-brown Nassa (0.6") 1.5 cm
Gussonea compacta (Nordsieck, 1968). Mediterranean. Shallow water; common. Family Nassariidae.



Tranquebar Goblet (1.5") 4 cm
Cantharus tranquebaricus (Gmelin, 1791). Southern Asia. Shallow water; common.



Ridged Goblet (1.5") 4 cm
Cantharus spiralis (Gray, 1839). Indian Ocean. Among intertidal rocks; common.



Waved Goblet (1.4") 3.5 cm
Cantharus undosus (L., 1758). Tropical Indo-Pacific. On muddy rocks and under dead coral; common.



Gray Goblet (0.7") 1.8 cm
Cantharus assimilis (Reeve, 1845). W. Africa; Cape Verde Is. Under stones in shallow water; common.



Elegant Goblet (1.8") 4.5 cm
Cantharus elegans (Griffith & Pidgeon, 1834). Baja California to Peru. On intertidal rocks; common.



Smoky Goblet (1") 2.5 cm
Cantharus fumosus (Dillwyn, 1817). Indo-Pacific. Shallow water; moderately uncommon. Syn.: *proteus* Reeve.



Wagner's Goblet (1") 2.5 cm
Cantharus wagneri (Anton, 1839). Tropical Pacific. Shallow water; moderately uncommon.



Pagoda Goblet (1.8") 4.5 cm
Cantharus pagodus (Reeve, 1846). W. Mexico to Panama. Shallow water; uncommon.



Strawberry Goblet (1") 2.5 cm
Polia fragaria (Wood, 1828). Indian Ocean. Shallow water; uncommon. Syn.: *carolinae* Kiener; *bella* Reeve.



Beautiful Goblet (1") 2.5 cm
Polia pulchra (Reeve, 1846). Indo-W. Pacific. Shallow water; uncommon.



Measle-mouth Cantharus (1") 2.5 cm
Cantharus sanguinolentus (Duclos, 1833). W. Mexico to Ecuador. Subtidal; common.



Ringed Cantharus (1") 2.5 cm
Cantharus ringens (Reeve, 1846). W. Mexico to Ecuador. Intertidal; common.



Pale Goblet (1.8") 4.5 cm
Solenosteira pallida (Broderip & Sowerby, 1829). Panama. Shallow water; moderately common.



Fusiform Goblet (2") 5 cm
Solenosteira fusiformis (Blainville, 1832). Panama to Peru. Intertidal rocks; common.



Canete's Whelk (2.5") 6 cm
Bartschia canetae (Clench & Aguayo, 1944). Off Cuba in 600 m; rare. Holotype illus.



Spout Goblet (1.5") 4 cm
Triumphis subrostrata (Wood, 1828). West Mexico to Colombia. Mud flats; locally common.



Ethiop Macron (2.5") 6.5 cm
Macron aethiops (Reeve, 1847). W. Mexico; common. Syn.: *kelleitii* A. Adams.



Swollen Florida Whelk (1") 2.5 cm
Ptychosalpinx globulus (Dall, 1889). Florida Straits and Bahamas. Deep water; rare.



Bartsch Whelk (1.5") 4 cm
Bartschia significans Rehder, 1943. Southern Florida. Deep water; uncommon.



Little Turnip Whelk (2") 5 cm
Tomlinia rapulum (Reeve, 1846). Malaya; Indonesia. Uncommon.



Maculated Dwarf Triton (2.5") 6 cm
Colubraria muricata (Lightfoot, 1786). Indo-Pacific. Uncommon. Syn.: *maculosa* Gmelin.



Twisted Dwarf Triton (2") 5 cm
Colubraria tortuosa (Reeve, 1844). Indo-W. Pacific. Reefs; uncommon. Syn.: *distorta* S. & W., not Lamarck.



Shiny Dwarf Triton (1.7") 4.5 cm
Colubraria nitidula (Sowerby, 1833). Tropical Indo-Pacific. Shallow water; uncommon.



Fantome's Dwarf Triton (1.5") 4 cm
Colubraria fantomei Garrard, 1961. Japan to Australia; uncommon. Syn.: *castanea* Kuroda & Habe.



Narrow Dwarf Triton (1") 2 cm
Colubraria alfredensis Bartsch, 1915. Port Alfred, S. Africa. Beached; uncommon. Holotype illustrated.



Obscure Dwarf Triton (1.2") 3 cm
Colubraria obscura (Reeve, 1844). Florida to Brazil. Shallow reefs; uncommon.



Princely Dwarf Triton (3") 7.5 cm
Colubraria procera (Sowerby, 1832). S.W. Mexico. Under rocks to 20 m; moderately rare.



Souverbie's Dwarf Triton (1.5") 3.5 cm
Colubraria souverbii (Reeve, 1844). Philippines. 50 to 100 m; uncommon.



Spiral Babylon (2.5") 6.5 cm
Babylonia spirata (L., 1758). Indian Ocean. In mud to 60 m; common.



Japanese Babylon (3") 7.5 cm
Babylonia japonica (Reeve, 1842). Japan; Taiwan. Offshore 10-20 m; common. Has a dark brown periostracum.



Areola Babylon (2.5") 6.5 cm
Babylonia areolata (Link, 1807). S.E. Asia. On sand 10-20 m; common. Suture deep but not channeled.



Indian Babylon (2.5") 6.5 cm
Babylonia zeylanica (Bruguière, 1789). Indian Ocean. Offshore; common. Siphonal canal tinged violet.



Pallid Babylon (1.5") 4 cm
Babylonia pallida (Perry, 1811).
S.E. Asia; Indonesia. Offshore;
common. Not *B. pallida* Kira.



Borneo Babylon (1.5") 4 cm
Babylonia borneensis (Sowerby, 1864). East Indies. Shallow water; uncommon.



Lutose Babylon (2") 5 cm
Babylonia lutosa (Lamarck, 1822). E. Asia. In mud; common.



Spotted Babylon (1.5") 4 cm
Babylonia papillaris (Sowerby, 1825). S. Africa. Offshore to 95 m; uncommon.



Bodalla Babylon (1") 2.5 cm
Zemira bodalla Garrard, 1966.
Southern Queensland. On mud at 160 m; moderately common. In Olividae?



Common Northern Buccinum (3") 7.5 cm
Buccinum undatum L., 1758.
Arctic Seas to New Jersey and to Portugal. 2-200 m; abundant.



Finely-striate Buccinum (3.5") 8 cm
Buccinum striatissimum Sowerby, 1899. Alaska to Japan. Deep water; uncommon.



Silky Buccinum (2.5") 6 cm
Buccinum scalariforme Möller, 1842. Arctic Seas to Wash. and Maine. Offshore; common. Syn.: *tenuis* Gray, not Schröter.



Polar Buccinum (2.5") 6 cm
Buccinum polare Gray, 1839.
Arctic Seas to Japan, to Alaska; N. Europe. Offshore; common.



Yellow-mouth Buccinum (3") 7.5 cm
Buccinum leucostoma Lischke, 1872. Japan. 50 to 60 m. Syn.: *chartium* Dall.



Flaky Buccinum (3") 7.5 cm
Buccinum hydrophanum Hancock, 1846. Canadian Arctic to Grand Banks. Offshore; common.



Angulate Buccinum (2.5") 6 cm
Buccinum angulosum Gray, 1839. Bering Sea; Alaska. Offshore; uncommon.



Zelotes Buccinum (2.5") 6 cm
Buccinum zelotes Dall, 1907.
Sea of Japan. Deep water; un-
common. Holotype illustrated.



Isaotaki Buccinum (3") 7.5 cm
Buccinum isaotakii Kira, 1959
(1962). Sea of Japan. Deep wa-
ter; uncommon.



Nippon Buccinum (2.5") 5 cm
Buccinum niponense Dall,
1907. Offshore, southern Ja-
pan. Uncommon.



Middendorff's Buccinum
(4") 10 cm
Buccinum middendorffi
Verkruzen, 1882. Arctic Seas;
Japan; Siberia. Common.



Humphreys's Buccinum
(3") 7 cm
Buccinum humphreysianum
Bennett, 1825. Circumboreal;
Japan; N. America. Common.



Torr's Whelk (2.5") 6 cm
Godfreyina torri Verco, 1909.
Southern Australia. Offshore;
common.



Ample Fragile Buccinum
(1.5") 4 cm
Volutharpa ampullacea (Mid-
dendorff, 1848). Arctic Seas.
Offshore; common.

SWAMP CONCHS,
MELON CONCHS
FAMILY MELONGENIDAE

Tropical in nature, this group of large, operculate conchs is usually found in brackish or muddy water near mangroves. They are carnivorous, feeding mostly on oysters and clams. There are about 30 species.



West Indian Crown Conch (5")
12 cm *Melongena melongena*
(L., 1758). West Indies. Muddy,
brackish water; intertidal;
common.



Pacific Crown Conch (6") 15 cm
Melongena patula (Broderip &
Sowerby, 1829). W. Mexico to
N. Ecuador. Intertidal mud
creeks; common.



Common Crown Conch
(3") 7.5 cm
Melongena corona (Gmelin,
1791). Florida to N.E. Mexico.
Mangrove areas; abundant.
Many variable forms.



Giant Hairy Melongena
(6") 15 cm
Pugilina morio (L., 1758). Trini-
dad to Brazil; West Africa. Man-
grove areas; common.



Spiral Melongena (6") 15 cm
Pugilina cochlidium (L., 1758).
Indian Ocean. Shallow, muddy
water. Syn.: *wardiana* Iredale.



Nutmeg Melongena (2.5") 7 cm
Volema myristica Röding, 1798.
S.W. Pacific. Shallow water,
sandy mud; common. Syn.: *ga-*
leodes Lamarck.



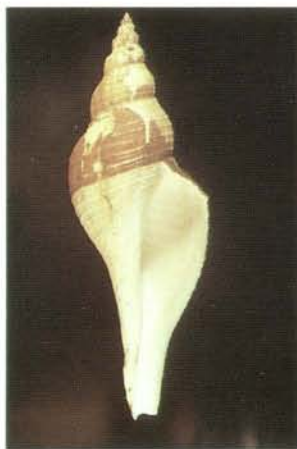
Pear Melongena (2") 5 cm
Volema paradisiaca Röding,
1798. Indian Ocean. Intertidal
to 2 m; common. Syn.: *pyrum*
Gmelin, not Linnaeus.



(left) **Tuba False Fusus** (6") 14 cm
Hemifusus tuba (Gmelin, 1791).
Japan. (right) **Ternate False Fu-**
sus. *H. ternatanus* (Gmelin).
S.E. Asia. Both common.



Thick-tail False Fusus (10")
25 cm *Hemifusus crassicaudus*
(Philippi, 1849). Indian Ocean
to Japan. Common. Syn.: *tuba*
of Kira.



Colossal False Fusus (10") 25 cm
Hemifusus colosseus (La-
marck, 1816). S.E. Asia; Taiwan.
Offshore; common.



Australian Trumpet (30") 80 cm
Syrinx aruanus (L., 1758). North
Australia. Intertidal to 10 m; lo-
cally common. Periostracum
thick, gray.



Perverse Whelk (7") 18 cm
Busycon perversum (L., 1758).
N.E. Mexico. Offshore to 20 m;
on sand bottom; uncommon.
Syn.: *kieneri* Philippi.



Lightning Whelk (to 16") 40 cm
Busycon contrarium (Conrad,
1840). S.E. United States. Subti-
dal to 30 m; in sand. Large spec-
imens white. Common.



Knobbed Whelk (8") 20 cm
Busycon carica (Gmelin, 1791).
Massachusetts to N.E. Florida.
Subtidal to 10 m; common.



Kiener's Whelk (7") 18 cm
Busycon carica subspecies *eli-*
ceans (Montfort, 1810). North
Carolina to central east Florida.
Offshore; common.



Pear Conch (4") 10 cm
Busycon spiratum (Lamarck,
1816). S.E. United States and
N.E. Mexico. Shallow water;
common. Syn.: *pyrum* Dill.



Channeled Whelk (7") 18 cm
Busycon canaliculatum (L., 1758). Cape Cod, Massachusetts, to N.E. Florida. Common. Introduced to California 1948.



Turnip Whelk (5") 13 cm
Busycon coarctatum (Sowerby, 1825). Bay of Campeche, E. Mexico. Offshore; uncommon.

NASSA MUD SNAILS
FAMILY NASSARIIDAE

The mud snails, or basket shells, are shallow water, usually intertidal, mud dwellers. They occur in large colonies, and are scavengers. A few of the several hundred species live in deep water. The operculum is chitinous. The genus *Nassa* Lamarck is a synonym of *Nassarius*.



Callused Bullia (1.5") 4 cm
Bullia callosa (Wood, 1828). South Africa. Offshore to 30 m; common.



Annulate Bullia (2.5") 6 cm
Bullia annulata (Lamarck, 1816). False Bay to Port Alfred, S. Africa. Offshore to 100 m; common.



Smooth Bullia (2.5") 6 cm
Bullia tenuis (Reeve, 1846). False Bay to Natal, S. Africa. Offshore to 120 m; common. Syn.: *larva* Bartsch, 1915.



Pure Bullia (1.2") 3 cm
Bullia pura Melville, 1885. South Africa. Subtidal; common. Syn.: *balteatus* Sowerby; *kraussi* Turton.



Mauritius Bullia (2") 5 cm
Bullia mauritiana (Gray, 1839). Indian Ocean. Subtidal; common. Syn.: *grayi* Reeve.



Ribbon Bullia (1.3") 3 cm
Bullia vittata (L., 1767). Indian Ocean. Intertidal, mud flats; common. Syn.: *buccinoidea* & *granulosa* Lamarck.



Gradated Bullia (2.5") 6 cm
Bullia gradata (Deshayes, 1844). E. South America. Subtidal; common. Syn.: *cochlidium* Kiener.



One-ridge Bullia (1.5") 4 cm
Bullia monilifera (Kiener, 1834). E. South America. Subtidal; common. Syn.: *armata* Gray.



Karachi Bullia (2") 5 cm
Bullia kurrachensis Angas, 1877. Karachi, Pakistan. Shallow water; locally common.



Globular Bullia (1.5") 4 cm
Bullia globulosa (Kiener, 1834).
S. Brazil to Argentina. Subtidal
on sand; common.



Myristic Nassa (0.5") 1.2 cm
Nassarius myristicatus (Hinds,
1844). W. Central America. Off-
shore; common.



Glossy Bullia (1") 2.5 cm
Cyllene glabrata A. Adams,
1851. Philippines. Offshore to
30 m; moderately common.



Eastern Mud Snail (1") 2.5 cm
Ilyanassa obsoleta (Say, 1822).
Nova Scotia to N. Florida. Mud
flats; abundant. Also Califor-
nia.



Pimpled Nassa (1.5") 4 cm
Nassarius papillosus (L., 1758).
Indo-Pacific. Intertidal to 10 m;
moderately common.



Glans Nassa (1.5") 4 cm
Nassarius glans (L., 1758). Indo-
Pacific. Intertidal; common.
Syn.: *particeps* Hedley; *li-
neatus* Röding.



Cake Nassa (1.2") 3 cm
Nassarius arcularius (L., 1758).
Central and S.W. Pacific. Shal-
low sandy bays; abundant.
Syn.: *coronatus* Link; *plicata*
Röding.



Cone-shaped Nassa (1") 3 cm
Nassarius conoidalis (De-
shayes, 1832). Indian Ocean.
Shallow water; common. Syn.:
clathrata Lamarck, not Born.



Triton Nassa (1") 2.5 cm
Nassarius tritoniformis (Kiener,
1841). Senegal, West Africa.
Offshore; common.



Torben Wolf Nassa (1") 2.5 cm
Nassarius wolffi Knudsen, 1956.
South West Africa. Offshore;
uncommon.



Clathrate Nassa (0.5") 1.2 cm
Nassarius clathratus (Born,
1778). Mediterranean and N.W.
Africa. Intertidal sand; com-
mon.



New Zealand Nassa (0.8") 2 cm
Nassarius aoteanus (Finlay,
1927). New Zealand. Shallow
water; common. Syn.: *corona-
tus* E. A. Smith.



Common Eastern Nassa (0.5") 1.2 cm
Nassarius vibex (Say, 1822). S.E. United States. Intertidal sand flats; abundant.



Latticed Nassa (0.5") 1.2 cm
Nassarius cinisculus (Reeve, 1853). West Indies. Weedy shallows; common.



New England Nassa (0.7") 1.8 cm
Nassarius trivittatus (Say, 1822). East United States. Offshore to 50 m; common.



Lovely Nassa (0.7") 1.8 cm
Nassarius venustus (Dunker, 1847). Indo-Pacific Intertidal sand; uncommon.



Demoulia Nassa (0.7") 1.8 cm
Nassarius desmoulioides (Sowerby, 1903). West and South Africa. 40 to 90 m; locally common.



Mutable Nassa (1.3") 3 cm
Nassarius mutabilis (L., 1758). Mediterranean; Black Sea; W. Africa. Offshore; common. Syn.: *inflata* Lamarck.



Netted Nassa (1.4") 3 cm
Nassarius reticulatus (L., 1758). W. Europe; Mediterranean. Subtidal, mud and rocks; abundant.



Swollen Nassa (0.8") 2 cm
Nassarius gibbosulus (L., 1758). East Mediterranean. Intertidal, sand; common. Syn.: *circumcinctus* A. Adams.



Horn Nassa (0.8") 2 cm
Nassarius cornicula (Olivi, 1792). Mediterranean and West Africa. Intertidal; common. Many synonyms; *olivacea* Risso; *politum* Bivona.



Gloomy Nassa (0.4") 1 cm
Nassarius moestus (Hinds, 1844). W. Mexico. Intertidal; common. Syn.: *brunneostoma* Stearns, 1893.



Fat Nassa (0.8") 2 cm
Nassarius corpulentus (C. B. Adams, 1852). W. Mexico to Ecuador. Subtidal, sand; common.



Western Mud Nassa (0.8") 2 cm
Nassarius tiarula (Kiener, 1841). California to W. Mexico. Intertidal; common. Syn.: *tegula* Reeve; *major* Stearns.



Red-banded Nassa (0.8") 2 cm
Nassarius pyrrhus (Menke, 1843). South Australia; Tasmania; New Zealand. Intertidal sands; common.



Splendid Nassa (1.2") 3 cm
Nassarius speciosus (A. Adams, 1852). South Africa. Offshore to 90 m.



Pyramid Nassa (0.8") 2 cm
Nassarius pyramidalis (A. Adams, 1852). South Africa. Subtidal to 200 m; common. Syn.: *filmerae* Sowerby; *rufanensis* Sowerby.



Distorted Nassa (1") 2.5 cm
Nassarius distortus A. Adams, 1852. Indo-Pacific. Shallow water; common. Syn.: *monile* Kiener (not Linnaeus).



Bright Nassa (0.7") 1.8 cm
Nassarius candens (Hinds, 1844). Marquesas Islands, Polynesia. Subtidal; locally uncommon.



Cake Nassa * (1.3") 3 cm
Nassarius arcularius (L., 1758). Indo-Pacific. Intertidal sand and mud flats. Abundant. Syn.: *coronatus* Link; *plicata* Röding.



Burned Nassa (1") 2.5 cm
Nassarius crematus (Hinds, 1844). Japan—S.W. Pacific. Shallow water; uncommon. Syn.: *siquijorensis* A. Adams; *crenulatus* Lamarck.



Horrid Nassa (0.5") 1.2 cm
Nassarius horridus (Dunker, 1847). Indo-Pacific. Intertidal; common. Syn.: *muricatus* Quoy & Gaimard; *curtus* Gould.



Margarite Nassa (1") 2.5 cm
Nassarius margaritiferus Dunker, 1847. Indo-Pacific. Intertidal; common. Syn.: *costellifera* A. Adams; *reticulatus* Quoy & Gaimard.



Olive Nassa (1") 2.5 cm
Nassarius olivaceus (Bruguière, 1789). Indo-Pacific. Subtidal mud flats; common. Syn.: *badius* A. Adams.



Channeled Nassa (1.2") 3 cm
Nassarius dorsatus (Röding, 1798). Indo-Pacific. Intertidal flats; common. Syn.: *canaliculatus* Lamarck.



Gaudy Nassa (1") 2.5 cm
Nassarius gaudiosus (Hinds, 1844). Indo-Pacific. Intertidal to 5 m; common. Syn.: *reeveanus* Dunker.



Rough Nassa (1.2") 3 cm
Nassarius hirtus (Kiener, 1834). Hawaii and Polynesia. Subtidal to 20 m; common. Syn.: *seminodosa* A. Adams.



Whitish Nassa (0.7") 1.8 cm
Nassarius albescens (Dunker, 1846). Indo-Pacific. Shallow; coral sand; common. Syn.: *bicolor* Rousseau.



Distended Nassa (1") 2.5 cm
Nassarius sufflatus (Gould, 1860). Indian Ocean to Japan. Intertidal to 10 m; common. Syn.: *balteatus* Lischke; *kurodai* Tomlin.



Neat Nassa (0.8") 2 cm
Nassarius concinnus (Powis, 1835). Indo-Pacific. Offshore; uncommon. Syn.: *abysicola* A. Adams; *crebrilineata* Rousseau.



Gruner's Nassa (0.8") 2 cm
Nassarius gruneri (Dunker, 1846). S.W. Pacific. Intertidal; common. Syn.: *hispidus* Reeve.



Granulated Nassa (0.7") 1.8 cm
Nassarius graniferus (Kiener, 1834). S.W. Pacific. Intertidal to 6 m, coral sand; common. Syn.: *verrucosus* Bruguière.



Globose Nassa (0.7") 1.8 cm
Nassarius globosus Quoy & Gaimard, 1833. S.W. Pacific. Intertidal flats; abundant. Syn.: *gibbosuloidea* Habe & Kosuge.



Black Nassa (1") 2.5 cm
Nassarius pullus (L., 1758). Indo-Pacific. Mud flats; common. Syn.: *thersites* Bruguière; *bimaculosus* A. Adams.



Loaded Nassa (0.7") 1.8 cm
Nassarius oneratus (Deshayes, 1863). Indo-Pacific. Intertidal; uncommon. Syn.: *obliqua* Rousseau.



Cyclops Nassa (0.3") 5 mm
Cyclope pellucida (Risso, 1826). Mediterranean. Subtidal, sand; common.



Obtuse Demoulia (1") 2.5 cm
Demoulia obtusata (Link, 1807). West Africa. Subtidal, sand; common. Syn.: *pinquius* A. Adams.



Blunted Demoulia (1") 2.5 cm
Demoulia retusa (Lamarck, 1816). South Africa. Offshore 10 to 110 m; common. Variable patterns.



One-banded Nassa (0.8") 2 cm
Nassarius cuvierii (Payraudeau, 1826). Mediterranean. Intertidal; common. Syn.: *unifasciatus* Kiener; and others.



Giant Western Nassa (2") 5 cm
Nassarius fossatus (Gould, 1849). British Columbia to W. Mexico. Intertidal, sandy mud; abundant.

TULIPS AND SPINDLES
FAMILY FASCIOLARIIDAE

The tulips and horse conchs are large carnivorous snails, without strong plicae or folds on the columella, usually with a good periostracum, and with a thick, horny, clawlike operculum. Mainly tropical shallow water.



Florida Horse Conch (2') 60 cm
Pleuroploca gigantea (Kiener, 1840). S.E. United States and N.E. Mexico. Subtidal to 30 m; common. Young are orange.



Panama Horse Conch
(1.5') 50 cm
Pleuroploca princeps (Sowerby, 1825). W. Mexico to Ecuador. Subtidal; common. Operculum ridged.



Trapezium Horse Conch
(6") 14 cm
Pleuroploca trapezium (L., 1758). Indo-Pacific. Shallow water; common.



Filamentous Horse Conch
(5") 12 cm
Pleuroploca filamentosa (Röding, 1798). Indo-Pacific. Common.



Smooth Horse Conch
(3") 7.5 cm
Pleuroploca glabra (Dunker, 1882). Japan. Intertidal rocks to 3 m; common.



Persian Horse Conch (5") 12 cm
Pleuroploca persica (Reeve, 1847). Indian Ocean. Offshore to 10 m; rare. Syn.: *ponderosa* Philippi.



South African Horse Conch
(6") 15 cm
Pleuroploca ocellifera (Lamarck, 1816). South Africa. 20 to 150 m; common. Syn.: *verruculatus* Lamarck.



Salmon Horse Conch (4") 10 cm
Pleuroploca salmo (Wood, 1828). W. Mexico to Panama. Offshore; common. Syn.: *valenciennesi* Kiener.



Granose Horse Conch
(5") 12 cm
Pleuroploca granosa (Broderip, 1832). Gulf of California to N. Peru. Intertidal; common.



Heynemann's Horse Conch (6") 15 cm
Pleuroploca heynemanni (Dunker, 1876). South Africa. Subtidal to 100 m; uncommon. Syn.: *alfredensis* Bartsch.



Drab Horse Conch (4") 10 cm
Pleuroploca lugubris (Reeve, 1847). South Africa. Intertidal and offshore to 50 m; common. Syn.: *badia* Krauss.



Box-tree Conch (3.5") 9 cm
Pleuroploca buxea (Reeve, 1847). W. Africa; Cape Verde Is. Shallow water; locally common. Syn.: *fischeriana* Petit.



Box-tree Conch (3.5") 9 cm
Pleuroploca buxea (Reeve, 1847). The holotype of *Latirus maximus* Sowerby, illustrated here, is merely an old shell.



Banded Tulip (3.5") 9 cm
Fasciolaria lilium hunteria (Perry, 1811). North Carolina to Texas. Intertidal and down to 12 m; common. Neotype illus.



Branham's Tulip (4.5") 11.5 cm
Fasciolaria lilium branhamae Rehder & Abbott, 1951. Gulf of Campeche, Texas. Deep water; uncommon. Holotype illus.



Bullis's Tulip (5") 12 cm
Fasciolaria lilium bullisi Lyons, 1972. Off N.W. Florida. Dredged 73 - 119 m; uncommon. Holotype illustrated.



True Tulip (6") 15 cm
Fasciolaria tulipa (L., 1758). Florida to Texas; W. Indies; Brazil. On sand in shallow water; common.



Precious Stone Shell (1.5") 4 cm
Latirolagena smaragdula (L., 1758). Indo-Pacific. Intertidal rocks; common. Syn.: *rustica* Lamarck.



Thorn Latirus (1.5") 4 cm
Opeatostoma pseudodon (Burrow, 1815). W. Mexico to Peru. Among rocks at low tide; common. Syn.: *cingulatum* Lamarck.



Spear Latirus (2") 5 cm
Dolicholatus lancea (Gmelin, 1791). Tropical Indo-Pacific. Coral reefs; uncommon. Syn.: *lanceola* Reeve.



Cyrtulus Spindle (3") 7.5 cm
Cyrtulus serotinus Hinds, 1844. Polynesia; rare. Only living species in the genus *Cyrtulus*.



Barclay's Latirus (2.3") 6 cm
Latirus polygonus (Gmelin, 1791). Indo-Pacific. Intertidal reefs; common. Form *barclayi* Reeve, 1847, on right.



Many-angled Latirus (3") 7.5 cm
Latirus polygonus (Gmelin, 1791). The black zones present in typical form.



Nodular Latirus (3") 7.5 cm
Latirus nodatus (Gmelin, 1791). Tropical Indo-Pacific. Coral reef flats; uncommon. Syn.: *rigidus* Wood.



Gibbose Latirus (2.7") 7 cm
Latirus gibbulus (Gmelin, 1791). Indo-W. Pacific. On reef flats in shallow water. Usually heavily encrusted.



Belcher's Latirus (2") 5 cm
Latirus belcheri (Reeve, 1847). W. Pacific; moderately common.



Ornate Latirus (2.5") 6 cm
Latirus amplustris (Dillwyn, 1817). Tropical Pacific. Coral areas; uncommon. Syn.: *aplustre* Sowerby.



Squamose Latirus (1.4") 3.5 cm
Latirus squamosus Pease, 1863. Polynesia; uncommon. Indian Ocean records unconfirmed.



Bleeding Latirus (2") 5 cm
Latirus sanguifluus (Reeve, 1847). Polynesia. Among corals in shallow water; uncommon.



Prismatic Latirus (2") 5 cm
Latirus iris (Lightfoot, 1786). Polynesia; uncommon. Periostracum iridescent when wet. Syn.: *prismaticus* Martyn.



Tower Latirus (2") 5 cm
Latirus turritus (Gmelin, 1791). Indo-W. Pacific. Under dead coral or rocks in shallow water; moderately common.



Central American Latirus (2.2") 5.5 cm
Latirus mediamericanus Hertlein & Strong, 1951. W. Mexico to Ecuador; uncommon. Syn.: *acuminatus* Wood.



Filose Latirus (2") 5 cm
Latirus filiosus (Schubert & Wagner, 1829). W. Africa. Off-shore; uncommon.



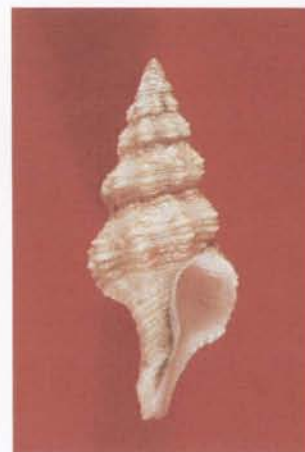
Nagasaki Latirus (2") 5 cm
Latirus nagasakiensis E. A. Smith, 1880. Southern Japan. Offshore; uncommon.



Kanda Latirus • (1.5") 4 cm
Latirus kanda Kuroda, 1950. Japan. Shallow water; uncommon.



Walker's Latirus (1") 2.5 cm
Latirus walkeri Melvill, 1895. Western Australia. Among rocks in shallow water; moderately common.



Pagoda Latirus (1.2") 3 cm
Latirus pagodaformis Melvill, 1899. Northern Arabian Sea; Persian Gulf. Moderately deep water; rare.



Nassa-like Latirus (1.5") 4 cm
Latirus nassoides (Reeve, 1847). Philippines. Shallow reefs; uncommon.



Paetel's Latirus (2") 5 cm
Latirus paetelianus (Kobelt, 1874). Indo-W. Pacific. Among rocks; common. Solid brown or banded.



Strange Latirus (2.5") 6.5 cm
Latirus abnormis (Sowerby, 1894). Pondoland; Natal; Zululand. Dredged down to 80 m; uncommon.



Gold-banded Latirus (1") 2.5 cm
Latirus noumeensis (Crosse, 1870). Tropical Indo-Pacific. Intertidal and offshore; uncommon. Syn.: *aureocincta* Sby.



Armed Latirus (1.4") 3.5 cm
Latirus armatus A. Adams, 1854. West Africa; Madeira; Canary Islands. Offshore; uncommon.



Brown-lined Latirus (3") 7.5 cm
Latirus infundibulum (Gmelin, 1791). W. Indies to Brazil, S. Florida. Offshore to 60 m; uncommon.



Trochlear Latirus (2") 5 cm
Latirus cariniferus (Lamarck, 1816). S.E. Florida; W. Indies. Rocky reefs; uncommon. Syn.: *macgintyi* Pilsbry.



Squat Latirus (2.5") 6.5 cm
Latirus tumens Carpenter, 1856. West Mexico to Ecuador. On rocks 10 - 20 m; uncommon.



Hemphill's Latirus (2.2") 5.5 cm
Latirus hemphilli Hertlein & Strong, 1951. Baja California to Panama. Dredged to 27 m; uncommon.



Frilled Latirus (1.8") 4.5 cm
Latirus concentricus (Reeve, 1847). W. Mexico to Ecuador. Offshore; uncommon. Syn.: *spadiceus* Reeve.



Socorro Latirus (1.5") 4 cm
Latirus socorroensis Hertlein & Strong, 1951. Off W. Mexico to Clipperton Is. Dredged to 42 m; uncommon.



Vara's Latirus (3") 7 cm
Latirus varai Bullock, 1970. Off east Cuba in 200 m. Rare. Holotype illus.



Waxy Latirus (2") 5 cm
Leucozonia cerata (Wood, 1828). Gulf of California to Panama; Galapagos. On rocks at low tide; common.



White-spotted Latirus (.8") 2 cm
Leucozonia ocellata (Gmelin, 1791). S.E. Florida; W. Indies to Brazil. Under intertidal rocks; common.



Three-row Latirus (1.2") 3 cm
Latirus triserialis Lamarck, 1822. West Africa. Uncommon.



Fleshy Peristernia (1") 2.5 cm
Peristernia incarnata (Kiener, 1840). Indo-Pacific. Under intertidal rocks and coral; moderately common.



Fine-net Peristernia (1.4") 3.5 cm
Peristernia nassatula (Lamarck, 1822). Indo-Pacific. Reef flats; common. Aperture rosy.



Sloping Peristernia (1.2") 3 cm
Peristernia fastigium (Reeve, 1847). Indo-Pacific. On dead coral in shallow water; uncommon.



Australian Peristernia (1") 3 cm
Peristernia australiensis (Reeve, 1847). Queensland, Australia. On intertidal reefs under dead coral; common.



Philbert's Peristernia (1.2") 3 cm
Peristernia philberti (Récluz, 1844). South China Sea; uncommon. Aperture violet.



Singed Peristernia (1.2") 3 cm
Peristernia ustulata (Reeve, 1847). Indo-Pacific. Coral areas; common. Syn.: *caledonica* Petit; *marquesana* Ad.



Beautiful Peristernia (1.2") 3 cm
Peristernia pulchella (Reeve, 1847). Indian Ocean. Muddy sand in moderately deep water; uncommon.



Forskal's Peristernia (1") 2.5 cm
Peristernia forskali (Tapparone-Canefri, 1879). Indian Ocean. Shallow water; uncommon.



Spiny Peristernia (1.4") 3.5 cm
Peristernia columbarium (Gmelin, 1791). Central Pacific to Philippines; uncommon. Syn.: *spinosa* Deshayes.



Harford's Spindle (2") 5 cm
Fusinus harfordii (Stearns, 1871). British Columbia to California. Moderately deep water; rare.



Distaff Spindle (6") 15 cm
Fusinus colus (L., 1758). Tropical Indo-Pacific. Intertidal sands and offshore; common. Syn.: *tuberculata* Lamarck.



Wavy-edge Spindle (6") 15 cm
Fusinus undatus (Gmelin, 1791). Tropical Pacific. Offshore; uncommon. All-white shell; brown periostracum.



Salisbury's Spindle (8") 20 cm
Fusinus salisburyi Fulton, 1930. Japan; Queensland, Australia. Deep water; uncommon.



Giant Spindle (8") 20 cm
Fusinus novaehollandiae (Reeve, 1848). New S. Wales to S. Australia. Deep water; moderately common.



Rusty Spindle (3.5") 9 cm
Fusinus perplexus A. Adams, 1864. Form *ferrugineus* Kuroda & Habe. Japan. Offshore; locally common.



Legrand's Spindle (2") 5 cm
Fusinus undulatus (Perry, 1811). Southern Australia. Common. Syn.: *legrandi* Tenison-Woods.



Granular Spindle (2.5") 6.5 cm
Fusinus niponicus (E. A. Smith, 1879). Japan; Taiwan. Moderately deep water; uncommon.



Hayashi's Spindle (2") 5 cm
Fusinus hayashii (Habe, 1961). Southern Japan. Dredged at 100 m; rare. *F. niponicus* has longer siphonal canal.



Brown-lipped Spindle (3.5") 9 cm
Fusinus tuberosus (Reeve, 1847). South of Honshu, Japan. 20-40 m; uncommon. Syn.: *nigrostratus* E. A. Smith.



Pitcairn Spindle (5") 12.5 cm
Fusinus galathea bountyi Rehder & Wilson, 1975. Off Pitcairn Is. Dredged 50-130 m; rare. Holotype illus.



Australian Spindle (4") 10 cm
Fusinus australis (Quoy & Gaimard, 1833). Southern and western Australia. Shallow water; common.



Nicobar Spindle (4.5") 11.5 cm
Fusinus nicobaricus (Röding, 1798). Indo-Pacific. Shallow water; common. Syn.: *laticostatus* Deshayes; *variegatus* Perry.



Boettger's Spindle (2") 5 cm
Fusinus boettgeri (von Maltzan, 1884). West Africa. Offshore; uncommon.



Capart's Spindle (8") 20 cm
Fusinus caparti Adam & Knudsen, 1969. Off Angola. Dredged at about 80 m; locally common.



White Spindle (3") 7.5 cm
Fusinus albinus (A. Adams, 1855). Off Angola. Offshore; uncommon.



Kobelt's Spindle (2.5") 6.5 cm
Fusinus kobelti (Dall, 1877). California. Shallow water to 70 m; moderately common. Holotype illus.



Du Petit's Spindle (8") 20 cm
Fusinus dupetitthouarsi (Kiener, 1846). Baja California to Ecuador. Intertidal and offshore; moderately common.



Allyn Smith's Spindle (3.5") 9 cm
Fusinus allyni McLean, 1970. Galapagos and Cocos Is. Dredged 128-146 m; uncommon.



Burnt Spindle (2") 5 cm
Fusinus ambustus (Gould, 1853). Gulf of California. Mud flats and on rocks at low tide; common.



Panama Spindle (5") 12.5 cm
Fusinus panamensis Dall, 1908.
W. Mexico to Ecuador. Taken by
shrimp trawlers; common.



Sea Crown Spindle (3") 7.5 cm
Fusinus halistreptus (Dall,
1889). Florida Strait; Bahamas.
Deep water; rare. Holotype il-
lus.



Ornamented Spindle (3") 7.5 cm
Fusinus eucosmius (Dall, 1889).
Florida to Texas. Dredged 30-
100 m; uncommon. Holotype
illustrated.



Ceramic Spindle (2") 5 cm
Fusinus ceramidus (Dall, 1889).
Off Barbados. Dredged 140-210
m; rare. Holotype illustrated.



Turnip Spindle (4") 10 cm
Fusinus timessus (Dall, 1889).
Florida to Texas. Dredged 40-
120 m; uncommon. May be
white or orange.



Frenguelli's Spindle (4.5")
11 cm *Fusinus frenguelli* (Car-
celles, 1953). Southern Brazil;
Argentina. Dredged 30-160 m
on sand; uncommon.



Steger's Spindle (5") 12 cm
Fusinus stegeri Lyons, 1978.
Gulf of Mexico; off west Flori-
da. 180 m. Holotype illustrat-
ed.



Coue's Spindle (4") 10 cm
Fusinus couei (Petit, 1853). Gulf
of Mexico; Texas. Taken by
shrimp trawlers; common.



Sicilian Spindle (2.3") 6 cm
Fusinus syracusanus (L., 1758).
Mediterranean; coast of N.W.
Africa; Canary Is. Offshore 4 to
40 m; common.



Flame Spindle (3") 7.5 cm
Propefusus pyralatus (Reeve,
1847). Southern Australia; Tas-
mania. Shallow and deeper wa-
ter; common.



Puzzling Spindle (1") 2.5 cm
Sinistralia maroccensis (Gme-
lin, 1791). W. Africa; Canary Is.
Shallow water, on rocks; un-
common.

OLIVE SHELLS FAMILY OLIVIDAE

Small, glossy gastropods found
in all tropical and warm seas.
Columella with numerous fine
teeth. True olive shells (*Oliva*)
do not have an operculum.
Their shells are often extremely
variable in color pattern but are
consistent in shape within a
species.



Tent Olive (3.5") 9 cm
Oliva porphyria (L., 1758). Gulf of California to Panama. Intertidal to 20 m; in sand; moderately common.



Veined Olive (1.8") 4.5 cm
Oliva spicata (Röding, 1798). Gulf of California to Panama. Shallow water; common. Many synonyms.



Angled Olive (2.2") 5.5 cm
Oliva incrassata (Lightfoot, 1786). West Mexico to Peru. Sandspits at low tide; common. Rarely golden.



Juliet's Olive (1.8") 4.5 cm
Oliva julieta Duclos, 1833. Nicaragua to Peru. Offshore; rare living, uncommon dead.



Splendid Olive (1.8") 4.5 cm
Oliva splendidula Sowerby, 1825. W. Mexico to Panama. Offshore; uncommon. Pattern constant.



Peruvian Olive (2") 5 cm
Oliva peruviana Lamarck, 1811. Peru and Chile. Extremely variable with several named color forms; common.



Fusiform Olive (2") 5 cm
Oliva fulgurator (Röding, 1798). Lower Caribbean. Uncommon. Syn.: *fusiformis* Lamarck.



Lettered Olive (2.2") 5.5 cm
Oliva sayana Ravenel, 1834. S.E. United States. Common. Syn.: *litterata* Lamarck. Yellow form is *citrina* Johnson.



Netted Olive (1.5") 4 cm
Oliva reticularis Lamarck, 1810. S.E. Florida to Brazil; Bermuda. Shallow and deeper water; common. Variable pattern.



Red-mouth Olive (2.5") 6.5 cm
Oliva miniacea (Röding, 1798). Tropical Indo-Pacific. Common. Orange aperture. Syn.: *erythrostoma* Lamarck.



Tessellate Olive (1.2") 3 cm
Oliva tessellata Lamarck, 1811. Eastern Indian Ocean; Pacific. Moderately uncommon. Syn.: *tigrina* Marrat.



Oliva sericea (Röding, 1798). One of the few distinctive color forms of this lovely shell in which the aperture is white, not yellow.



Orange-mouth Olive (3") 7.5 cm
Oliva sericea (Röding, 1798).
Tropical Indo-Pacific. Uncommon. Varies little in color pattern. Syn.: *textilina* Lam.



Ornate Olive (2") 5 cm
Oliva lignaria Marrat, 1868. Indian Ocean; India to West Australia. Common. Syn.: *ornata* Marrat, not Röding.



Pretty Olive (0.8") 2 cm
Oliva sidelia Duclos, 1835. Tropical Indo-Pacific. Moderately uncommon. Sometimes all-white. Syn.: *lepida* Duclos.



Tricolor Olive (2.2") 5.5 cm
Oliva tricolor Lamarck, 1811. Tropical Indo-Pacific. Common. Displays red, green and blue colors together.



Blood Olive (1.3") 4.5 cm
Oliva reticulata (Röding, 1798). Indo-W. Pacific. Common. Columella bright red. Syn.: *sanguinolenta* Lamarck.



Purple-mouth Olive (2") 5 cm
Oliva caerulea (Röding, 1798). Tropical Indo-Pacific. Uncommon. Aperture dark violet. Syn.: *episcopalis* Lamarck.



Inflated Olive (1.7") 4.5 cm
Oliva bulbosa (Röding, 1798). Indian Ocean to Indonesia. Common. Several named color forms. Syn.: *inflata* Lamarck.



Tiger Olive (2.2") 5.5 cm
Oliva tigrina Lamarck, 1811. Tropical Indo-Pacific. Moderately common. Syn.: *glandiformis* Marrat; *fallax* Johnson.



Amethyst Olive (2") 5 cm
Oliva annulata (Gmelin, 1791). Tropical Indo-Pacific. Common. Several striking color forms.



Amethyst Olive (2") 5 cm
Oliva annulata (Gmelin, 1791). This common form is *amethystina* Röding, 1798.



Amethyst Olive (2") 5 cm
Oliva annulata (Gmelin, 1791). Form *mantichora* Duclos, 1835. Upper part of body whorl is noticeably angled.



Hirase's Olive (1.7") 4.5 cm
Oliva hirasei Kira, 1959. Southern Japan; Taiwan. Below low-tide level; uncommon.



Parkinson's Olive (0.5") 1.2 cm
Oliva parkinsoni Prior, 1975.
New Guinea. Offshore; uncommon.



Bulow's Olive (1") 2.5 cm
Oliva buloui Sowerby, 1888.
New Guinea; New Britain; Solomons. Uncommon. *O. bulowi* is misspelling.



Red-lip Olive (1.7") 4.5 cm
Oliva rubrolabiata H. Fischer, 1902. New Hebrides; New Caledonia. Moderately rare.



Rufula Olive (1.2") 3 cm
Oliva rufula Duclos, 1835. Philippines; Indonesia. Locally common. Distinctive color pattern consistent.



Lightning Olive (0.8") 2.2 cm
Oliva rufofulgurata Schepman, 1911. New Britain; Kei Island; Indonesia; Philippines. Moderately deep water; rare.



Peg Olive (1") 2.5 cm
Oliva paxillus Reeve, 1850. Indo-Pacific; Hawaii. Common. Syn.: *thomasi* Crosse; *sandwichensis* Pease.



Common Olive (1.2") 3 cm
Oliva oliva (L., 1758). Tropical Indo-Pacific. Shallow water; common. Syn.: *ispidula* of authors.



Oliva oliva (L., 1758). Until recently this was incorrectly referred to as *ispidula* Linné. Variable in somber colors.



Black Olive (1.5") 4 cm
Oliva vidua (Röding, 1798). Tropical Indo-Pacific. Moderately common. Many named color forms, sometimes black.



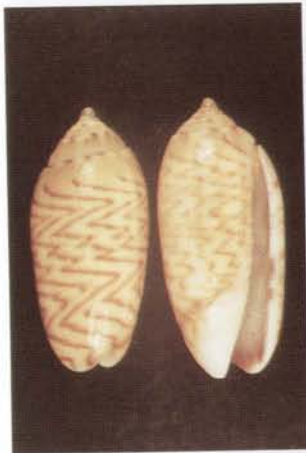
Flame Olive (1.4") 3.5 cm
Oliva flammulata Lamarck, 1810. W. Africa; Cape Verde Islands. Shallow water; common. Syn.: *marmorea* Marrat.



Silk-clad Olive (0.8") 2 cm
Oliva panniculata Duclos, 1835. Indo-W. Pacific. Shallow water; moderately rare. Syn.: *williamsi* Melville & Standen.



Carnelian Olive (0.9") 2.3 cm
Oliva carneola (Gmelin, 1791). Tropical Indo-Pacific. Common. Varies in shape and patterns.



Caldanian Olive (0.8") 2 cm
Oliva caldania Duclos, 1835. W. and N. Australia; Indonesia. Moderately common. Syn.: *brettinghami* Bridgman.



Zelinda's Olive (1.5") 4 cm
Oliva zelindae Petuch, 1979. Islands off east Brazil, 2 to 10 m. Rare. Axial riblets.



New Zealand Ancilla (.5") 1.2 cm
Gracilispira novaezelandiae (Sowerby, 1859). Northern New Zealand. In sand offshore; common. Syn.: *firthi* Olsson.



Graceful Dwarf Olive (0.8") 2 cm
Olivella gracilis (Broderip & Sowerby, 1829). W. Mexico to Panama. Shallow water; common.



West Indian Dwarf Olive (1.2") 3 cm
Olivella nivea (Gmelin, 1791). S.E. Florida to Brazil; Bermuda. Intertidal to 50 m; common.



Arrow Dwarf Olive (0.7") 1.8 cm
Olivella petiolita (Duclos, 1835). West Indies; Caribbean. Uncommon. Syn.: *esther* Dall & Simpson.



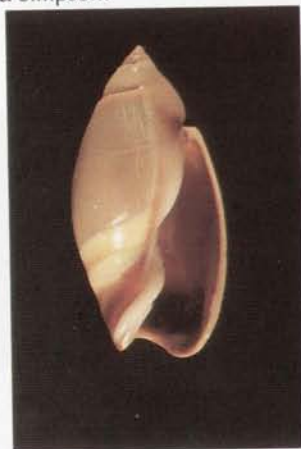
Variable Dwarf Olive (0.4") 1 cm
Olivella mutica (Say, 1822). North Carolina to Florida; Bahamas. Common. Sometimes brightly banded.



Dama Dwarf Olive (0.8") 2 cm
Olivella dama (Wood, 1828). Gulf of California to Acapulco. On sandspits, low tide; common. Spire apex violet.



Purple Dwarf Olive (1") 2.5 cm
Olivella biplicata (Sowerby, 1825). Vancouver Island (British Columbia) to Baja California. On sand to 50 m; common.



Twisted-plait Olive (1.2") 3 cm
Olivancillaria contortuplicata (Reeve, 1850). Uruguay to Brazil. Shallow water; common.



Ureta's Olive (1.4") 3.5 cm
Olivancillaria uretai Klappenbach, 1965. Argentina to Uruguay. On muddy sand; uncommon.



Gibbous Olive (2") 5 cm
Olivancillaria gibbosa (Born, 1778). Southern India; Sri Lanka. Common.



Sparkling Dwarf Olive (0.8") 2 cm
Olivella nana (Lamarck, 1811). West Africa.
Common. Syn.: *micans* Dillwyn; *minor*
Dunker.



Argentine Dwarf Olive (0.5") 1.2 cm
Olivella tehuelcha (Duclos, 1835). Argen-
tina to Brazil. Intertidal on sand; common.
Syn.: *tehuelchana* Orbigny.



Cingulate Ancilla (2.3") 6 cm
Ancillista cingulata (Sowerby, 1830). North-
ern half of Australia. Sand flats. Common.
Syn.: *inornata* E. A. Smith.



Ear Ancilla (1.5") 4 cm
Olivancillaria vesica auricularia (Lamarck,
1810). Argentina; Brazil. Subtidal in sand.
Common.



Mamillate Ancilla (1.5") 3.7 cm
Amalda mamillata (Hinds, 1843). S.W. Paci-
fic. Offshore to deep water; uncommon.



Golden-brown Ancilla * (2.5") 6 cm
Ancillista velesiana Iredale, 1936. S.
Queensland and New South Wales.
Trawled; moderately common.



Spear-head Ancilla * (2") 5 cm
Amalda contusa (Reeve, 1864). S. Africa.
Offshore to 100 m; uncommon. Syn.:
decipiens Sowerby.



Aristocratic Ancilla (2.2") 5.5 cm
Amalda optima (Sowerby, 1897). S. Africa;
Mozambique. Offshore to deep water;
moderately rare.



Margined Ancilla (1.5") 4 cm
Amalda marginata (Lamarck, 1811). New
South Wales; southern Australia; Tasma-
nia. Shallow water; uncommon.



Montrouzier's Ancilla (1.5") 4 cm
Amalda montrouzieri (Souverbie, 1860).
New Caledonia; Fiji. Rare.



Edith's Ancilla (0.6") 1.5 cm
Amalda edithae (Pritchard & Gatliff, 1899).
Southern Australia. On submerged sand-
banks; uncommon.



Blunt Ancilla (1.5") 4 cm
Amalda obtusa (Swainson, 1825). South Af-
rica. Offshore to 180 m; uncommon.



Ruddy Ancilla (1") 2.5 cm
Amalda rosea (Macpherson, 1951). New South Wales; Australia. Uncommon.



Bubble Ancilla (1.5") 4 cm
Amalda bullioides (Reeve, 1864). South Africa. Offshore, deep water; uncommon. Syn.: *dimidiata* von Martens.



Hinomoto Ancilla (1.7") 4.5 cm
Baryspira hinomotoensis (Yokoyama, 1922). Southern Japan. 50 to 200 m; uncommon.



Urasima Ancilla (1.5") 4 cm
Baryspira hinomotoensis form *urasima* (Kira, 1955). Japan. Offshore; uncommon. More slender.



Tindall's Ancilla (0.7") 1.8 cm
Amalda tindalli (Melvill, 1898). Off western coast of India. Moderately deep water; uncommon.



Petterd's Ancilla (0.9") 2.2 cm
Amalda petterdi (Tate, 1893). Victoria (South Australia); Tasmania. Shallow water; uncommon.



Tankerville's Ancilla (2") 5 cm
Amalda tankervillii (Swainson, 1825). Northern coast of South America. In sand, 6 - 13 m; locally common.



Golden Ancilla (2.5") 6.5 cm
Ancilla glabrata (L., 1758). Lower Caribbean. Offshore, in sand; uncommon. Syn.: *flavida* Lamarck.



Acuminate Ancilla (1.2") 3 cm
Ancilla acuminata (Sowerby, 1859). Red Sea; North Arabian Sea. Common. Syn.: *lineolata* A. Adams, *oryza* Reeve.



Delightful Ancilla (1.5") 4 cm
Ancilla suavis Yokoyama, 1922. Japan. Offshore, 160 - 200 m; uncommon.



Wide-mouth Ancilla (1.2") 3 cm
Amalda ampla (Gmelin, 1791). Indian Ocean. Offshore to about 20 m; uncommon. Syn.: *candida* Lamarck.



Depressed Ancilla (2") 5 cm
Amalda depressa (Sowerby, 1859). New Zealand. Intertidal sand flats. Moderately common.



Chinese Ancilla (2") 5 cm
Ancilla rubiginosa Swainson, 1823. China Sea. Shallow water; uncommon.



Brown-tipped Ancilla (2") 5 cm
Amalda muscae (Pilsbry, 1926). Northern half of Australia. Intertidal sand flats; common. Syn.: *elongata* Gray.



Reeve's Ancilla (0.8") 2 cm
Ancilla reevei E. A. Smith, 1904. South Africa. Moderately common. Syn.: *bipartita* Turton; major Turton.



White-banded Ancilla (0.8") 2.1 cm
Ancilla fasciata (Reeve, 1864). South Africa. Offshore; common. Syn.: *ordinaria* E. A. Smith.



Necklace Ancilla (1") 2.5 cm
Ancilla monilifera (Reeve, 1864). Western Australia. Moderately common. Syn.: *lineata* Kiener, not Perry.



Pointed Ancilla (2.3") 6 cm
Agaronia acuminata (Lamarck, 1811). West Africa. Shallow water; common. Syn.: *annotata* Marrat.



Panama False Olive (2") 5 cm
Agaronia testacea (Lamarck, 1811). Gulf of California to Peru. Intertidal; common. Syn.: *reevei* Mörch.



Blotchy Ancilla (2") 5 cm
Agaronia nebulosa (Lamarck, 1811). Indian Ocean. Shallow water; common. Syn.: *intricata* Marrat.



Blotchy Ancilla (1.5") 4 cm
Agaronia nebulosa (Lamarck, 1811). Indian Ocean. Moderately common. Syn.: *labuanensis* Marrat (syntypes).



Open-mouth Ancilla (1.5") 4 cm
Agaronia propatula (Conrad, 1849). S.W. Mexico to Ecuador. Common. Syn.: *hiatula* of authors.



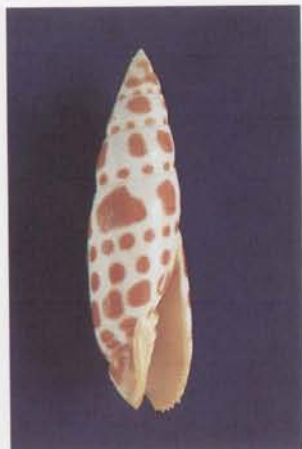
Travassos's Ancilla (2.5") 6.5 cm
Agaronia travassosi Morretes, 1938. Brazil. Offshore, 40 - 140 m; uncommon. Syn.: *lanei* Morretes; *langei* Zanardini.



Olive-gray Ancilla (1.2") 4.5 cm
Agaronia hiatula (Gmelin, 1791). West Africa; Cape Verde Islands. Shallow water; common. Syn.: *cincta* Reeve.

MITERS
FAMILY MITRIDAE

This family contains several hundred species most of which are colorful and live in warm shallow seas. The shells are usually elongate to fusiform, and the columella bears several small plicae, or teeth. Recently the family Costellariidae (i.e. Vexillidae) has been separated off to contain *Vexillum*, *Pusia* and *Thala*.



Episcopal Miter (4") 10 cm
Mitra mitra (L., 1758). Indo-Pacific; Galapagos. In sand, shallow water; common. Syn.: *episcopalis* Linné.



Papal Miter * (3") 8 cm
Mitra papalis (L., 1758). Entire Indo-Pacific. Coral rubble, 1 to 30 m; uncommon.



Pontifical Miter (2.5") 6.5 cm
Mitra stictica (Link, 1807). Indo-Pacific. Coral reefs, under rocks; common. Syn.: *pontificalis* Lamarck.



Bové's Miter (2.5") 6 cm
Mitra bovei Kiener, 1838. Red Sea and Persian Gulf. Subtidal, 1 to 30 m; uncommon. Syn.: *abacophora* Melvill.



Cardinal Miter (3") 7 cm
Mitra cardinalis (Gmelin, 1791). Indo-Pacific. In sand, shallow water; common. Syn.: *monachialis* Röding.



Particolored Miter (2") 5 cm
Mitra nubila nubila (Gmelin, 1791). Indo-Pacific. Coral sand; moderately rare. Syn.: *versicolor* Martyn; *lamarcki* Deshayes.



Ambiguous Miter (2.5") 6 cm
Mitra ambigua Swainson, 1829. Indo-Pacific. Coral reef flats; moderately common. Syn.: *limosa* Martyn.



Coffee Miter (2") 5 cm
Mitra coffea Schubert & Wagner, 1829. Entire Indo-Pacific. Syn.: *thaanumiana* Pilsbry from Hawaii. Holotype.



Coffee Miter (2") 5 cm
Mitra coffea Schubert & Wagner, 1829. Entire Indo-Pacific. Reef flats to 28 m; moderately common.



Imperial Miter (2") 5 cm
Mitra imperialis Röding, 1798. Entire Indo-Pacific. Coral areas; uncommon. Syn.: *digitalis* Link; *millepora* Lamarck.



Tessellate Miter (4") 10 cm
Mitra incompta (Lightfoot, 1786). Indo-Pacific. Reef flats to 40 m; rare. Syn.: *tessellata* Martyn; *reevei* Philippi.



Adusta Miter (2.5") 6 cm
Mitra eremitarum Röding, 1798. S.W. Pacific. Intertidal reef flats; abundant. Syn.: *adusta* Lamarck; *flavofusca* Lamarck.



Speckled Miter (2.5") 6 cm
Mitra guttata Swainson, 1824. Indian Ocean. Shallow water; rare. Syn.: *boswellae* J. Cate.



Stained Miter (3") 7.5 cm
Mitra inquinata Reeve, 1844. Japan to Taiwan. Offshore, 20 to 110 m; uncommon. Syn.: *hanleyana* Dunker; *wrighti* Crosse.



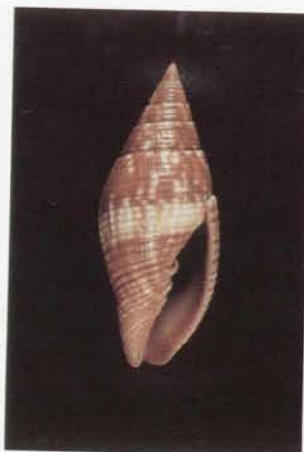
Triplicate Miter (2.5") 6 cm
Mitra triplicata von Martens, 1904. East Africa to Indonesia. Deep water to 1,400 m; uncommon.



Scorched Miter (2") 5 cm
Mitra ustulata Reeve, 1844. Entire Indo-Pacific. Shallow reefs; uncommon. Variable. Syn.: *ignobilis* Reeve.



Pyramis Miter (2") 5 cm
Mitra pyramis (Wood, 1828). Indo-Pacific. Shallow water to 50 m; uncommon.



Variable Miter (2") 5 cm
Mitra variabilis Reeve, 1844. Northern Australia. Intertidal to 100 m; common. Syn.: *polymorpha* Tomlin.



Carbon Miter (2.5") 6 cm
Mitra carbonaria Swainson, 1822. Australia; New Zealand. Shallow water; common. Syn.: *badia*, *nigra*, *rhodia* Reeve.



Deynzer's Miter (1.2") 3 cm
Mitra deynzeri Cernohorsky, 1980. Panglao Is., Philippines. Offshore; rare. Paratype illus.



Bald Miter (3.5") 9 cm
Mitra glabra Swainson, 1821. South Australia; Tasmania. Intertidal pools to offshore; common. Spire high.



Troubled Miter (1.2") 3 cm
Mitra aerumnosa Melvill, 1888. South Africa. Rare. Syn.: *simplex* Dunker.



Lightning Miter (2") 5 cm
Mitra fulgurita Reeve, 1844. East Indies. Shallow water; rare. Syn.: *yaekoae* Habe & Kosuge.



Oriental Miter (2.5") 6 cm
Mitra orientalis Griffith & Pidgeon, 1834. W. Colombia to Chile. Offshore to 150 m; uncommon. Syn.: *maura* Brod.



Zoned Miter (3") 8 cm
Mitra fusiformis subspecies *zonata* Marryat, 1818. Mediterranean to West Africa. Subtidal to 130 m; uncommon. *M. fusiformis* Brocchi is a fossil.



Helen's Miter (4") 10 cm
Mitra helenae Radwin & Bibbey, 1972. Atlantic coast of Central America. Offshore in 10 to 30 m; rare.



Swainson's Miter (5") 13 cm
Mitra swainsoni Broderip, 1836. West Mexico to Ecuador. Subtidal, 15 to 150 m; moderately common. Syn.: *zaca* Strong.



Antillean Miter (5") 13 cm
Mitra swainsoni subspecies *antillensis* Dall, 1889. S.E. U. S. to Caribbean. Offshore; uncommon. Holotype.



Rusty Miter (2") 5 cm
Mitra ferruginea Lamarck, 1811. Entire Indo-Pacific. Intertidal reefs; common. Syn.: *vitulina* Dillwyn.



Red-painted Miter (1.5") 3.5 cm
Mitra rubritincta Reeve, 1844. Entire Indo-Pacific. Intertidal to 20 m; moderately common.



Kettle Miter (1.5") 3.5 cm
Mitra cucumerina Lamarck, 1811. Indo-Pacific. Shallow coral waters; common. Syn.: *ferrugata* Dillwyn.



Chrysalis Miter (1") 2.5 cm
Mitra chrysalis Reeve, 1844. Indo-Pacific. Intertidal to 3 m; common. Spiral grooves are punctate. Syn.: *buryi* M. & S.



Colombella Miter (1.5") 4 cm
Mitra colombelliformis Kiener, 1838. Indo-Pacific. Shallow water, intertidal; common.



Strawberry Miter (2") 5 cm
Mitra fraga Quoy and Gaimard, 1833. Indo-Pacific. Intertidal coral reefs to 30 m; common. Syn.: *rubiginea* A. Adams.



Orange Miter (1.2") 3 cm
Mitra aurantia (Gmelin, 1791). Indo-Pacific. Shallow water; common. Syn.: *aurantiaca* Lamarck; *crassa* Swainson.



Gold-mouth Miter (1.2") 3 cm
Mitra chrysostoma Broderip, 1836. Entire Indo-Pacific. Shallow reefs; common. Coarse spiral cords. Spire blunt.



Contracted Miter (1.5") 3.5 cm
Mitra contracta Swainson, 1820. Indo-Pacific. Intertidal reef flats to 30 m; common. Apex pointed.



Tawny Miter (1.8") 4.5 cm
Mitra fulvescens Broderip, 1836. Indo-Pacific. Subtidal; uncommon. Syn.: *ostergaardi* Pilsbry (holotype illus).



Vexillate Miter (1") 2.5 cm
Mitra vexillum Reeve, 1844. S.W. Pacific. Reefs; uncommon.



Coronate Miter (1.2") 3 cm
Mitra coronata Lamarck, 1811. Entire Indo-Pacific. Intertidal to offshore; common. Syn.: *tiarella* A. Adams.



Punctured Miter (2") 5 cm
Mitra puncticulata Lamarck, 1811. S.W. Pacific; S. Japan. Intertidal coral reefs; uncommon. Syn.: *diadema* Swainson.



Flowery Miter (1.5") 3.5 cm
Mitra aurora subspecies *floridula* Sowerby, 1874. Indo-Pacific. Shallow reefs to 24 m; common. Holotype illus.



Sophie's Miter (1.5") 3.5 cm
Mitra sophiae Crosse, 1862. Australia to E. Polynesia. Intertidal to 60 m; uncommon.



Lens Miter (3") 7 cm
Mitra lens Wood, 1828. West Mexico to Ecuador. Intertidal gravel to 28 m; common. Syn.: *dupontiae* Kiener.



Belcher's Miter (5") 12 cm
Mitra belcheri Hinds, 1844. Gulf of California to Panama. Offshore to 100 m; uncommon.



Barbados Miter (1") 2.5 cm
Mitra barbadensis (Gmelin, 1791). S. Florida to Brazil; Bermuda. Subtidal in rubble to 10 m; common.



Nodulose Miter (1.2") 3 cm
Mitra nodulosa (Gmelin, 1791). S. Florida to Brazil; Bermuda. Intertidal to 20 m; common. Syn.: *brasiliensis* Oliveira.



Toothless Miter (1.5") 3.5 cm
Dibaphus edentula (Sowerby, 1823). Entire Indo-Pacific. Intertidal reef flats; uncommon. Syn.: *philippi* Crosse.



Florida Miter (2.5") 6 cm
Mitra florida Gould, 1856. Florida and the Caribbean. Sand bottom, 2 to 30 m; uncommon.



Poverty Miter (1") 2.5 cm
Mitra pauperula (L., 1758). Entire Indo-Pacific. Intertidal flats among rubble; locally abundant. Syn.: *zebra* Lamarck.



Magpie Miter (1.3") 3 cm
Mitra pica (Dillwyn, 1817). Indian Ocean and S.W. Pacific. Intertidal; uncommon. Syn.: *lineata* Swainson.



Blunted Miter (1") 2.5 cm
Mitra retusa Lamarck, 1811. Indo-Pacific. Intertidal reefs; uncommon. Aperture mauve. Syn.: *virgata* Reeve.



Lettered Miter (1") 2.5 cm
Mitra litterata Lamarck, 1811. Entire Indo-Pacific. Intertidal coral reef flats; common. Syn.: *maculosa* Reeve.



Shortened Miter (1.3") 3 cm
Mitra decurtata Reeve, 1844. S.W. Pacific. Intertidal reef flats; uncommon. Outer lip very thick.



Acuminate Miter (1.5") 3.5 cm
Mitra acuminata Swainson, 1824. Indo-Pacific. Intertidal coral reefs; moderately common.



Snake-tongue Miter (1") 2.5 cm
Mitra pellisserpentis Reeve, 1844. Mauritius to E. Polynesia. Intertidal to 2 m; common. Smooth or granulose.



Snake-tongue Miter (1") 2.5 cm
Mitra pellisserpentis sub-species *astricta* Reeve, 1844. Endemic to the Hawaiian Chain. Brown spiral lines.



Rehder's Miter (2.5") 6 cm
Mitra rehderi Webb, 1958. Off Tosa, Japan. 180 m; rare. Holotype illustrated.



Taiwan Miter (3.5") 9 cm
Mitra morchii A. Adams sub-species *taiwanica* Shikama & Chiang, 1977. Philippines to Taiwan; uncommon.



Chaste Miter (2") 5 cm
Scabricola casta (Gmelin, 1791). Indo-Pacific. In sand. Uncommon. Cleaning removes brown band. Syn.: *matronalis* Schum.



Eyed Miter (1") 2.5 cm
Scabricola ocellata (Swainson, 1831). Indo-Pacific. In sand. Uncommon. Syn.: *incisa* A. Adams; *mariei* A. Adams.



Newcomb's Miter (1.5") 4 cm
Scabricola newcombii (Pease, 1869). Hawaiian and Midway Is. (endemic). Subtidal, in sand. Uncommon.



Reticulate Miter (2") 5 cm
Scabricola fissurata (Lamarck, 1811). Indian Ocean. In coral sand and coral rubble. Uncommon. Reticulate pattern.



Dusky Miter (.75") 2 cm
Scabricola fusca (Swainson, 1824). Indo-Pacific. Uncommon in Indian Ocean, rare in western Pacific. Syn.: *limata* Reeve; *formosa* Reeve.



Snake Miter (2") 5 cm
Scabricola variegata (Gmelin, 1791). Philippines to Marquesas. In sand, shallow water. Rare. Syn.: *serpentina* Lam.



Desetangs's Miter (1") 2.5 cm
Scabricola desetangsii Kiener, 1838. Philippine Islands. Subtidal in sand; uncommon.



File Miter (1") 2.5 cm
Cancilla filaris (L., 1771). Indo-Pacific. Shallow water in sand; common. Syn.: *filosa* Born; *nexilis* Lamarck, 1811.



Most Superior Miter (1.2") 3 cm
Cancilla praestantissima (Röding, 1798). Indo-Pacific. Shallow water in coral sand; uncommon.



Horn-colored Miter (1.3") 3 cm
Cancilla carnicolor (Reeve, 1844). Indo-Pacific. Shallow water; uncommon. Syn.: *millepunctata* Sowerby; *pura* Ad.



Pease's Miter (1.5") 3.8 cm
Cancilla peasei (Dohrn, 1860). S.W. Pacific. Shallow flats; uncommon. Syn.: *langfordi* Pilsbry.



Philippine Miter (1.5") 3.8 cm
Cancilla bacillum (Lamarck, 1811). S.W. Pacific. Shallow reef flats; common. Syn.: *astygis* Dohrn.



Flecked Miter (2") 5 cm
Neocancilla granatina (Lamarck, 1811). Tropical Indo-Pacific. In sand, shallow water. Uncommon.



Gloriola Miter (1.5") 4 cm
Cancilla gloriola Cernohorsky, 1970. Philippines. Shallow water; uncommon. Syn.: *gracilis* Reeve, not Lea.



Butterfly Miter (2") 5 cm
Neocancilla papilio (Link, 1807). Indo-Pacific. In sand. Uncommon. Syn.: *sphaerulata* Martyn; *leucostoma* Gmelin.



Isao Taki Miter (2.5") 6 cm
Neocancilla takiisaoi Kuroda & Sakurai, 1959. Japan and Pitcairn Is. Shallow water; rare.



Orange Miter (1.5") 4 cm
Neocancilla arenacea (Dunker, 1852). Marquesas (endemic). Coral sand and rubble offshore. Rare.



Clathrus Miter (1.5") 4 cm
Neocancilla clathrus (Gmelin, 1791). Indo-Pacific. Shallow flats; uncommon. Syn.: *crenifera* Lamarck; *emersoni* Pilsbry.



Senegal Miter (1.2") 3 cm
Cancilla carinata Swainson, 1824. West Africa. Shallow water; uncommon. Syn.: *senegalensis* Reeve.



Cernohorsky's Miter (1.2") 3 cm
Cancilla cernohorskyi (Rehder & Wilson, 1975). Off Pitcairn Island; E. Polynesia. Rare. Holotype illustrated.



Hinds's Miter (1.2") 3.5 cm
Subcancilla hindsii (Reeve, 1844). West Mexico to Ecuador. Offshore to 51 m; uncommon.



Bright-spotted Miter (1") 2.5 cm
Subcancilla calodinata (S.S. Berry, 1960). West Mexico to Costa Rica. Offshore to 46 m; uncommon.



Red-lettered Miter (1") 2.5 cm
Subcancilla erythrogramma (Tomlin, 1931). West Mexico to Colombia. 18 to 37 m; uncommon. Syn.: *lineata* Broderip.



Isabelle's Miter (4") 10 cm
Cancilla isabella (Swainson, 1831). Western Pacific; Japan. Offshore to 50 m; uncommon.



Bonelike Miter (1") 2.5 cm
Imbricaria punctata (Swainson, 1821). Indo-Pacific. In sand, offshore; uncommon. Syn.: *truncata* Kiener; *ossea* Reeve.



Olive-shaped Imbricaria (0.3") 7 mm
Imbricaria olivaeformis (Swainson, 1821). Tropical Pacific. Intertidal sand; locally common.



Conus Miter (1.3") 3.5 cm
Pterygia conus (Gmelin, 1791). S.W. Pacific. Subtidal, shallow, sand; locally common. Syn.: *conulus* Röding.



Carbon Imbricaria (0.7") 1.8 cm
Imbricaria carbonacea (Hinds, 1844). West and S.W. Africa. Subtidal sands; moderately common.



Finger Miter (1.6") 4.5 cm
Pterygia dactylus (L., 1767). Indo-Pacific. In sand. Uncommon. Syn.: *nucella* Röding; *obesa* Reeve.



Finger Miter (1.6") 4.5 cm
Pterygia dactylus (L., 1767). Smooth form without spiral cut lines.



Nut Miter (2") 5 cm
Pterygia nucea (Gmelin, 1791). Indo-Pacific. In sand. Uncommon. Syn.: *spuria* Gmelin; *olivaria* Lamarck.



Fenestrate Miter (1.5") 4 cm
Pterygia fenestrata (Lamarck, 1811). Indo-Pacific. Shallow water, sand; uncommon. Syn.: *radula* Sowerby.



Crenulate Miter (1.3") 3 cm
Pterygia crenulata (Gmelin, 1791). Indo-Pacific. In sand. Uncommon. Syn.: *toleranda* Iredale; *fastidiosa* Iredale.



Crenulate Miter (1.3") 3.5 cm
Pterygia crenulata (Gmelin, 1791). Indo-Pacific; uncommon. Form *undulosa* Reeve, 1844, shown here.



Chinese Miter (1.5") 4 cm
Pterygia sinensis Reeve, 1844. East Asia. Offshore to 30 m; moderately common.



Modest Miter (0.75") 1.9 cm
Pterygia pudica (Pease, 1860). Central Pacific. Moderately rare. Syn.: *lifouana* Crosse; *subtexturata* Garrett.



Rough Miter (2") 5 cm
Pterygia scabricula (L., 1758). Indo-Pacific. Shallow coral waters; rare. Syn.: *texturata* Lamarck.

RIBBED MITERS
FAMILY COSTELLARIIDAE
(VEXILLIDAE)

These miters have been placed in a separate family on the basis of major soft part, anatomical differences. The interior of the aperture of the shell is always lirate, while in the Mitridae it is smooth. The Vexillidae have strong, sharp axial ribs, and sometimes strong spiral threads, or striae.



Plaited Miter (1.5") 4 cm
Vexillum plicarium (L., 1758). Indo-Pacific. In sand. Uncommon. Syn.: *plicatum* Röding; *lividum* Röding.



Rugose Miter (2") 5 cm
Vexillum rugosum (Gmelin, 1791). Indo-Pacific. In sand. Uncommon. Syn.: *corrugata* Lamarck; *hybrida* Kiener.



Little Fox Miter (2") 5 cm
Vexillum vulpecula (L., 1758). Indo-Pacific. In sand; common. Very variable. Syn.: *variabilis* Link; *caffrum* Linné.



Blood-striped Miter (1.5") 4 cm
Vexillum transpositum (Dautzenberg & Bouge, 1923). Indo-Pacific. Moderately rare. Syn.: *strigosa* Gmelin.



Jukes's Miter (1.3") 3.5 cm
Vexillum jukesii (A. Adams, 1853). Western Australia. Uncommon. Syn.: *interrupta* A. Adams; *superbiens* Melvill.



Queen Miter (2.3") 6 cm
Vexillum regina (Sowerby, 1828). West Pacific. Uncommon. Syn.: *citrina* Gmelin; *compressa* Sowerby.



Colorful Queen Miter (2.3") 6 cm
Vexillum regina form *filiareginae* J. Cate, 1961. Philippines. Shallow water; uncommon.



Ribboned Miter (2") 5 cm
Vexillum taeniatum (Lamarck, 1811). Indo-Pacific. Shallow water. Moderately rare. Syn.: *vitata* Swainson.



Formosan Miter (1.5") 4 cm
Vexillum formosense (Sowerby, 1890). Indonesia to Fiji; Taiwan. Offshore to 20 m; uncommon. Syn.: *utravis* Melvill.



Scarlet Miter (3") 7.5 cm
Vexillum coccineum (Reeve, 1844). China and Taiwan. Offshore from 3 to 30 m; locally common.



Costate Miter (2.5") 6 cm
Vexillum subdivisum (Gmelin, 1791). Indo-Pacific. Subtidal, in sand; common. Variable. Syn.: *lyratum* and *nigrina* Lamarck.



Costellate Miter (2.5") 6 cm
Vexillum subdivisum form *costellaris* (Lamarck, 1811). West Pacific. Uncommon.



Gruner's Miter (2.5") 6 cm
Vexillum gruneri (Reeve, 1844). S.W. Pacific. Shallow water; common. Syn.: *modesta* Reeve.



Stainforth's Miter (1.5") 4 cm
Vexillum stainforthi (Reeve, 1841). S.W. Pacific. Shallow water. Uncommon.



Taylor's Miter (2") 5 cm
Vexillum taylorianum (Sowerby, 1874). Philippines; Melanesia. Offshore; common.



Blood-stained Miter (0.7") 1.8 cm
Vexillum cruentatum (Gmelin, 1791). Red Sea to Samoa. Shallow water; uncommon. Syn.: *harpifera* Lamarck.



Dennison's Miter (2") 5 cm
Vexillum dennisoni (Reeve, 1844). Philippines and Indonesia. Shallow water; uncommon.



Granular Miter (2") 5 cm
Vexillum granosum (Gmelin, 1791). Indo-Pacific. Shallow water; moderately common. Syn.: *cancellata* Röding.



Bloodsucker Miter (2") 5 cm
Vexillum sanguisugum (L., 1758). Indo-Pacific. Shallow reefs; common. Syn.: *stigmataria* Lamarck.



Basket Miter (0.7") 1.8 cm
Vexillum lubens (Reeve, 1845). Indo-Pacific. In sand. Moderately rare. Syn.: *corbicula* Sowerby; *diamesa* Hervier.



Decorated Miter (1.5") 4 cm
Vexillum unifasciatum (Wood, 1828). Indo-Pacific. Subtidal; uncommon. Syn.: *clathrata* and *decora* Reeve.



Pinpricked Miter (1") 2.5 cm
Vexillum acupictum (Reeve, 1844). Entire Indo-Pacific. Shallow water; uncommon.



Miraculous Miter (2") 5 cm
Vexillum mirabile (A. Adams, 1853). S.W. Pacific. Shallow water, sand, to 53 m; uncommon. Syn.: *angulosa* Reeve.



Half-banded Miter (1") 2.5 cm
Vexillum semifasciatum (Lamarck, 1811). Red Sea to Samoa. Shallow water, sand; common.



Spiny Miter (1") 2.5 cm
Vexillum echinatum (A. Adams, 1853). Tropical Indo-Pacific. In sand. Uncommon. Syn.: *mucronata* Broderip.



Crowned Miter (1.2") 3 cm
Vexillum stephanucha (Melvill, 1897). Persian Gulf. Offshore; rare.



Saffron Miter (.75") 1.9 cm
Vexillum crocatum (Lamarck, 1811). Indo-Pacific. Sand and coral rubble. Uncommon. Syn.: *aurantia* Broderip.



Beautiful Florida Miter (0.5") 1.2 cm
Vexillum pulchellum (Reeve, 1843). S.E. Florida and West Indies. Subtidal to 30 m; uncommon.



Half-brown Miter (0.7") 1.8 cm
Vexillum epiphanea Rehder, 1943. S.E. Florida; Bahamas; Bermuda. Subtidal to 3 m; uncommon.



Bernhard's Miter (0.7") 1.8 cm
Vexillum bernhardiana (Röding, 1798). Indo-Pacific. Shallow water reefs; uncommon. Syn.: *muriculata* Lamarck.



Thousand-rib Miter (1.2") 3 cm
Vexillum millecostatum (Broderip, 1836). Melanesia. Shallow water; uncommon. Syn.: *evelynae* Melvill.



Turban Miter (0.7") 1.8 cm
Vexillum turben (Reeve, 1844). Western Pacific to Polynesia. Subtidal to 20 m; uncommon. Syn.: *kanaka* Pilsbry.



Cancellaria Miter (1") 2.5 cm
Vexillum cancellarioides (Anton, 1839). Indo-Pacific. Reef flats; uncommon. Syn.: *tuberculata* Kiener; *nodosa* Swain.



Ebony Miter (0.8") 2 cm
Vexillum ebenus (Lamarck, 1811). Mediterranean; W. Europe. Shallow water; common. Syn.: *defranceii* Payraudeau.



Roughened Miter (1") 2.5 cm
Vexillum exasperatum (Gmelin, 1791). Entire Indo-Pacific area. Shallow reef flats; common. Syn.: *torulosa* Lamarck.



Patriarchal Miter (1.3") 3 cm
Vexillum patriarchalis (Gmelin, 1791). Entire Indo-Pacific area. Shallow reef flats to 4 m; uncommon.



Reeve's Bloodied Miter (0.7") 1.8 cm
Vexillum consanguineum (Reeve, 1845). Tropical West Pacific. Coral reef sand flats; uncommon. Syn.: *rusa* Gould.



Specious Miter (0.7") 1.8 cm
Vexillum speciosum (Reeve, 1844). Indo-Pacific. Shallow water to 5 m; uncommon. Syn.: *trizonalis* Dautzenberg.



Fiery Miter (0.7") 1.8 cm
Vexillum moelleri (Küster, 1840). Hawaiian Islands to Polynesia and New Caledonia. Moderately rare. Syn.: *flammulata* Pease; *zebrina* Garrett; *baldwinii* Melvill.



Black-banded Miter (0.6") 1.5 cm
Vexillum luculentum (Reeve, 1845). Philippines to Samoa. Under coral. Uncommon. Syn.: *diachroa* A. Adams & Reeve; *graeffei* Crosse.



Amanda Miter (0.7") 1.8 cm
Vexillum amanda (Reeve, 1845). Tropical Pacific. Shallow reef flats; uncommon.



Golden Miter (0.5") 1.2 cm
Vexillum aureolatum (Reeve, 1844). Tropical Indo-Pacific. In sand under coral. Uncommon. Syn.: *pilsbryi* Hedley; *bizonalis* Dautzenberg & Bouge.



Woldemar's Miter (1") 2.5 cm
Zierliana woldemarii (Kiener, 1838). Tropical Pacific. Moderately common. Very variable. Syn.: *solidula* Reeve; *crenuplicata* A. Adams.

CHANK SHELLS FAMILY TURBINELLIDAE (XANCIDAE)

The heavy chank and vase shells have 3 to 5 strong, squarish, spiral teeth on the columella. Most species feed on worms and clams in the shallow waters of tropical shores. The operculum is chitinous and clawlike. Eggs are laid in horny, circular capsules. There are about two dozen species.



Ceramic Vase (4") 10 cm
Vasum ceramicum (L., 1758). Entire Indo-Pacific, except Red Sea. 1 to 4 m; moderately common. 3 columellar folds.



Armed Vase (2") 5 cm
Vasum armatum (Broderip, 1833). Eastern Polynesia. Lower columella white; two rows of equal-size knobs. Locally common.



Common Pacific Vase (2.5")
6 cm *Vasum turbinellus* (L., 1758). Entire Indo-Pacific. Intertidal to 2 m; abundant. Syn.: *cornigera* Lamarck.



Common Pacific Vase (2.5")
6 cm *Vasum turbinellus* form *cornigerum* (Lamarck, 1822). Spines extra long. Philippines. Common.



Imperial Vase (3") 7.5 cm
Vasum tubiferum (Anton, 1839). Central Philippines only. Shallow water. Locally common. Syn.: *imperialis* Reeve.



Rhinoceros Vase (3") 7.5 cm
Vasum rhinoceros (Gmelin, 1791). Central East Africa. Intertidal; locally common. Yellow color form rare.



Crosse's Vase (3.5") 9 cm
Vasum crosseanum (Souverbie, 1875). Seychelles islands. Offshore, shallow water; rare.



Truncate Vase (3") 7 cm
Vasum truncatum (Sowerby, 1892). South Africa. Offshore; rare. Periostracum is thick and with bristles.



Truncate Vase (2") 5 cm
Vasum truncatum (Sowerby, 1892). Young specimen has low nodules and is slightly umbilicate.



Helmet Vase (2.5") 6 cm
Vasum cassiforme (Kiener, 1841). Brazil. Shallow water to 2 m; locally uncommon. Syn.: *cassidiformis* Kiener.



Caribbean Vase (3") 7.5 cm
Vasum muricatum (Born, 1778). Florida and Caribbean. Subtidal to 2 m; common.



Latirus-shaped Vase (3") 7.5 cm
Siphovasum latiriforme (Rehder & Abbott, 1951). Gulf of Campeche, Mexico. Offshore to 50 m; rare. Holotype illus.



Latirus-shaped Vase (3") 7.5 cm
Siphovasum latiriforme (Rehder & Abbott, 1951). Orange color form, very rare. Sometimes yellow.



Globe Vase (1") 2.5 cm
Vasum globulus subspecies *nuttingi* (Henderson, 1919). Lesser Antilles. Shallow water; locally common.



Spiny Caribbean Vase (2.5") 6 cm
Vasum capitellum (L., 1758). Caribbean. Offshore reefs; uncommon.



Armored Tudicula (2.5") 6 cm
Tudicula armigera (A. Adams, 1855). Western Australia. Offshore to 30 m; locally common.



Kurtz's Tudicula (3") 7 cm
Tudicula armigera subspecies *kurtzi* Macpherson, 1963. Western Australia. Offshore; Uncommon.



Spineless Tudicula (1.7") 4 cm
Tudicula inermis Angas, 1878. Western and N. Australia. Offshore 10 to 30 m; rare.



Spiral Tudicula (3") 7 cm
Tudicula (not *Tudicula*) *spirillus* (L., 1767). S.E. India. Offshore to 20 m; locally common.



Zanzibar Tudicula (1.5") 4 cm
Tudicula zanzibarica Abbott, 1958. Zanzibar. Offshore, sand, 6 m; rare. Holotype illustrated.



True Afer (2") 5 cm
Afer afer (Gmelin, 1791). West Africa. Offshore, 1 to 5 m; uncommon.



Cuming's Afer (3") 7 cm
Afer cumingii (Reeve, 1844). Japan to Taiwan. Offshore to 50 m; common. Syn.: *couderti* Petit.



Purple-mouth Afer (1") 2.5 cm
Afer porphyrostoma (Adams & Reeve, 1847). West Africa. Offshore to 40 m; rare.



Flinder's Vase (6") 15 cm
Altivasum flindersi (Verco, 1914). S. and W. Australia. Offshore, deep water; uncommon. Syn.: *aurantiacus* Verco.



West Indian Chank (8") 20 cm
Turbinella angulata (Lightfoot, 1786). Bahamas, N. Cuba, E. Mexico to Panama. Common.



Indian Chank (4") 10 cm
Turbinella pyrum (L., 1758) S.E. India and Ceylon. Abundant offshore. Left-handed rare (Sacred Chank of India).



Great Indian Chank (6") 15 cm
Turbinella pyrum form *napus* Lamarck, 1822. As individual becomes older, the shell becomes swollen, smoother.



Andaman Chank (6") 15 cm
Turbinella pyrum subspecies *fusus* Sowerby, 1825. Andaman Sea. Offshore to 15 m; locally common.



Brazilian Chank (5") 13 cm
Turbinella laevigata Anton, 1839. N.E. Brazil. Subtidal to 4 m; locally common. Syn.: *ovoidea* Kiener.

HARP SHELLS FAMILY HARPIDAE

There are fewer than two dozen species in this colorful family. The strong axial ribs and wide aperture and smooth columella are characteristic. Most are tropical shallow-water dwellers. There is no operculum. Eggs are laid in soft capsules. Australia has a few deep-water rare species.



Minor Harp (2") 5 cm
Harpa amouretta Röding, 1798. Entire Indo-Pacific. Intertidal to 3 m on sand; common. Syn.: *minor* Lamarck; *crassa* Krauss.



Imperial Harp (3") 8 cm
Harpa costata (L., 1758). Islands of S.W. Indian Ocean (Mauritius). Shallow water; rare. Syn.: *imperialis* Lamarck.



Ventral Harp (4") 10 cm
Harpa ventricosa Lamarck, 1816. Red Sea to S. Africa. Subtidal; common. Spire low, shoulder spines strong.



David Harp (3") 8 cm
Harpa davidis Röding, 1798. Andaman Sea; Maldives. Uncommon. Few ribs, brown blotch with white triangle.



Major Harp (3.5") 9 cm
Harpa major Röding, 1798. Entire Indo-Pacific. Common. Shell heavy, oval; narrow white band between brown blotches.



Polynesian Harp (1") 2.6 cm
Harpa gracilis Broderip & Sowerby, 1829. Polynesia; Clipperton Island. Coral sand dweller; uncommon.



Articulate Harp (3.5") 9 cm
Harpa articularis Lamarck, 1822. S.W. Pacific. Common. Narrow, brown-lined ribs; large weak brown spot.



True Harp (2.8") 7 cm
Harpa harpa (L., 1758). Entire Indo-Pacific; common. Shell stout, shouldered, ribs flat; blotches of orangish between.



Panama Harp (3") 8 cm
Harpa crenata Swainson, 1822.
W. Mexico to W. Colombia.
Offshore to 30 m; uncommon.



Doris Harp (2.5") 6 cm
Harpa doris Röding, 1798. Cape
Verde Islands to Angola; As-
cension Island. Rare. Syn.: *ro-*
sea Lamarck.



Punctate Harp (1.3") 3.5 cm
Austroharpa punctata (Verco,
1896). South Australia. Off-
shore, 30 to 40 m; very rare.



Exquisite Harp (1") 2.4 cm
Austroharpa exquisita (Iredale,
1931). S.E. and South Australia.
Offshore from 50 to 160 m; un-
common.



Wilson's Harp (1") 2.5 cm
Austroharpa wilsoni Rehder,
1973. Western Australia. Off-
shore, 120 to 240 m; rare.

VOLUTES FAMILY VOLUTIDAE

The large colorful volutes are among the most popular collector's items. Many live in deep water and are difficult to obtain. Only a few genera, such as *Voluta* and *Neptuneopsis*, have an operculum. The columella may have strong, slanting ridges, or plicae, or be very weak. All are carnivorous, and most are tropical.



Hebrew Volute (6") 15 cm
Voluta ebraea L., 1758. N. and
N.E. Brazil. On coral, rock or
sand, 10-20 fathoms. Common.
Syn.: *chorosina* Lamarck.



Common Music Volute (3")
7.5 cm *Voluta musica* L., 1758.
Caribbean. On sand to 5
fathoms. Locally common.
Syn.: *lineata* Röding; *guineaica*
Lamarck.



De Marco's Music Volute (3.2")
8 cm (lower): *demarcoi* Olsson,
1965. (upper): form *morrisoni*
Petuch, 1980. W. Caribbean.
Offshore; uncommon.



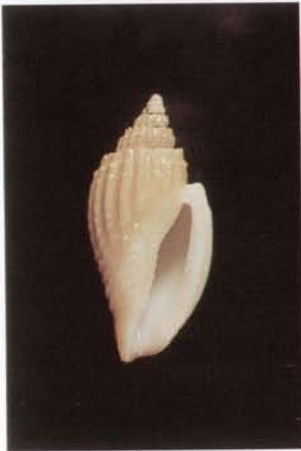
Green Music Volute (2") 5 cm
Voluta virescens Lightfoot,
1786. S.W. Caribbean. Off-
shore; rare. Variable.



Deepsea Volute (3.5") 9 cm
Volutocorbis abyssicola (Adams
& Reeve, 1850). South Africa.
Deep water to 550 m; uncom-
mon.



Boswell's Volute (2") 5 cm
Volutocorbis boswellae Reh-
der, 1969. S. Africa. Dredged,
80 to 300 m. Rare. Holotype il-
lus.



Corroded Volute (1") 2.5 cm
Volutocorbis gilchristi (Sowerby, 1902). South Africa. Trawled, 150-200 fathoms. Rare.



Grimy Volute (2.5") 6 cm
Volutocorbis lutosa Koch, 1948. South Africa to Senegal. 40 to 100 fathoms. Locally common. Syn.: *nicklesi* Rosso, 1976.



Kilburn's Volute (1.5") 4 cm
Volutocorbis kilburni Rehder, 1974. South Africa. Deep water; 400 m; rare. Holotype illustrated.



Minute Volute (1") 2.5 cm
Volutocorbis nana Rehder & Weaver, 1974. Off Natal, South Africa. 400 m; rare. Holotype illus.



Studer's Volute (2") 5 cm
Ternivoluta studeri (von Martens, 1897). New South Wales; Australia. Offshore; uncommon.



Beau's Lyria (2.5") 6.5 cm
Lyria beauii (Fischer & Bernardi, 1857). Lesser Antilles; W. Indies. Moderately deep water. Rare.



Archer's Lyria (2.5") 5 cm
Lyria archeri (Angas, 1865). Lesser Antilles. Offshore in sand; rare.



Delessert's Lyria (2") 5 cm
Lyria delessertiana (Petit, 1842). Madagascar to Comoro Island; Seychelles. Uncommon.



Quekett's Lyria (2") 5 cm
Lyria quekettii (E.A. Smith, 1901.) South Africa; Mozambique. 320 to 360 m; and from fish stomachs. Rare.



Delightful Lyria (1.2") 3 cm
Lyria deliciosa (Montrouzier, 1859). New Caledonia. On algae in coral-sand pockets, shallow water. Rare.



Lyre-formed Lyria (4") 10 cm
Lyria lyraeformis (Swainson, 1821). E. Africa. Offshore, moderately deep water. Uncommon.



Miter-shaped Lyria (2") 5 cm
Lyria mitraeformis (Lamarck, 1811). South Australia. Offshore; moderately common. Syn.: *grangeri* Sowerby.



Anna Lyria (2") 5 cm
Lyria anna (Lesson, 1835). Indonesia. Rare. No reliable records available. Syn.: *costata* Swainson; *harpa* Swainson.



Kuroda's Lyria (3.5") 9 cm
Lyria kurodai (Kawamura, 1964). Taiwan. Trawled in 44 m; rare.



Flat-ribbed Volute (3") 7.5 cm
Lyria planicostata (Sowerby, 1903). Taiwan to Philippines. Offshore; uncommon. Syn.: *santoensis* Ladd.



Taiwan Lyria (3") 7.5 cm
Lyria taiwanica Lan, 1975. Taiwan, central Philippines. Offshore to 100 m. Rare. Syn.: *kawamurai* Habe.



Heart Lyria (1.5") 4 cm
Lyria cordis Bayer, 1971. Greater Antilles. Deep water, 174 m; rare. Holotype illustrated.



Vega's Lyria (2.3") 6 cm
Lyria vegai Clench & Turner, 1967. Dominican Republic; W. Indies. Offshore. Rare. Ribbed on first 2 whorls only. Holotype.



Barnes's Lyria (1.2") 3 cm
Lyria barnesii (Gray, 1825). Lower California to Peru. Sand and mud, 40 - 80 m; uncommon. Syn.: *harpa* Barnes.



Helmet Lyria (1") 2.5 cm
Lyria cassidula (Reeve, 1849). Japan. Offshore, 20 to 40 m; common.



Guilding's Lyria (1") 2.5 cm
Enaeta cylleniformis (Sowerby, 1844). S.E. Florida to Brazil. Shallow water, coral sand, 1 to 10 m; locally common.



Cuming's Lyria (1.2") 3 cm
Enaeta cumingii (Broderip, 1832). W. Mexico to Peru. Intertidal to 2 m, sandy mud; common. Syn.: *pedersenii* Verrill.



Silklike Volute (4") 10 cm
Ericusa sericata Thornley, 1951. New South Wales to Queensland, Australia. 80 to 300 m; moderately common.



Lightning Volute (4") 10 cm
Ericusa fulgetra (Sowerby, 1825). South Australia. Sand bars at low tide to 250 m. Uncommon.



Sowerby's Volute (5.5") 14 cm
Ericusa sowerbyi (Kiener, 1839).
S. Australia; Tasmania. 10 - 200
m. Moderately common. Syn.:
fusiformis Swainson.



Festive Volute (4.5") 11 cm
Festilyria festiva (Lamarck,
1811). E. Africa; southern Ara-
bia. Offshore; rare.



Ponsonby's Volute (3") 7.5 cm
Festilyria ponsonbyi (E. A.
Smith, 1901). Natal, South Af-
rica. Offshore, 40 to 100 m;
rare.



Roadnight's Volute (8") 20 cm
Livonia roadnightae (McCoy,
1881). Southern Australia. Off-
shore, 50 to 200 m; uncommon.
Syn.: *quisqualis* Iredale.



Soulie's Volute (4") 10 cm
Cymbium souliei Marche-
Marchad, 1974. Ghana, W. Af-
rica. Offshore; uncommon.



Cucumber Volute (5") 12.5 cm
Cymbium cucumis Röding,
1798. Senegal, West Africa. Off-
shore, 10 to 50 m; uncommon.
Syn.: *rubiginosa* Swainson.



Elephant's Snout (10") 27 cm
Cymbium glans (Gmelin, 1791).
Senegal to Gulf of Guinea. Lit-
toral to 12 m; moderately com-
mon. Syn.: *proboscidalis* Lam.



Olla Volute (4") 10 cm
Cymbium olla (L., 1758). South-
ern Spain to Oran; Algeria and
Morocco. Dredged, 50 to 100
m; uncommon.



Dilated Baler (4") 10 cm
Cymbium pachyus (Pallary,
1930). West Africa. Littoral to 10
m; uncommon. Similar *C. olla*
has lower spire. Holotype illus.



African Neptune Volute
(8") 20 cm
Cymbium pepo (Lightfoot,
1786). West Africa. Uncom-
mon. Syn.: *neptuni* Gmelin.



Indian Volute (9") 23 cm
Melo melo (Lightfoot, 1786).
Malaysia; South China Sea. On
mud to 10 m; uncommon.
Syn.: *indica* Gmelin.



Crowned Baler (8") 20 cm
Melo aethiopica (L., 1758). In-
donesia. Offshore; uncom-
mon. Syn.: *tessellata* Lamarck;
nautica Lamarck.



Heavy Baler (12") 30 cm
Melo umbilicatus Sowerby, 1826. Australia to New Guinea. Shallow water; uncommon. Spines hide protoconch.



Milton Baler (12") 30 cm
Melo miltonis (Griffith & Pidgeon, 1834). S.W. Australia. Shallow water; common. Shoulder spines curve inwards.



Crown Volute (2.5") 6 cm
Cymbiola cymbiola (Gmelin, 1791). Indonesia. Offshore; uncommon. Syn.: *corona* Dillwyn; *flammula* Wood.



Banded Crown Volute (2.5") 6 cm
Cymbiola cymbiola (Gmelin, 1791). Indonesia. Offshore; uncommon. Banded color form.



Princely Volute (4") 10 cm
Cymbiola aulica (Sowerby, 1825). Southern Philippines. On sand, 4 to 50 m; uncommon. May be yellow or orange.



Cathcart's Volute (4") 10 cm
Cymbiola aulica form *cathcartiae* Reeve, 1856. Variation with reduced spines and lacking red color.



Golden-mouth Volute (2") 5 cm
Cymbiola chrysostoma (Swainson, 1824). Indonesia. Rare. No reliable records available. Syn.: *luteostoma* Deshayes.



Yellow Volute (3") 7.5 cm
Cymbiola flavicans (Gmelin, 1791). Northern Australia; New Guinea. Shallow water; moderately common.



Imperial Volute (8") 20 cm
Aulica imperialis (Lightfoot, 1786). Southern Philippines. On sand, shallow water; common. Syn.: *robinsona* Burch.



Robinson's Volute (8") 20 cm
Aulica imperialis form *robinsona* J. Q. Burch, 1954. Southern Philippines; uncommon.



Noble Volute (5.5") 14 cm
Cymbiola nobilis (Lightfoot, 1786). Taiwan to Singapore. Littoral to 100 m; common. Syn.: *scapha* Gmelin.



Bullate Volute (2.5") 6 cm
Callipara bullatiana Weaver & Dupont, 1967. South Africa. Offshore and beached; moderately common. Syn.: *bullata* Swainson.



Magnificent Volute (10") 25 cm
Cymbiola magnifica (Gebauer, 1802). East Australia. On sand to 120 m; moderately common. Syn.: *altispira* Mayblom.



Rossini's Volute (8") 18 cm
Cymbiola rossiniana (Bernardi, 1859). New Caledonia area only. Offshore in 3 to 10 m; uncommon.



Thatcher's Volute (3.5") 9 cm
Cymbiolacca thatcheri (McCoy, 1868). Chesterfield Island, north of New Caledonia. Rare.



Wiseman's Volute (3") 7.5 cm
Cymbiolacca wisemani (Brazier, 1870). Queensland. Offshore reefs, 1 to 30 m; uncommon. Syn.: *randalli* Stokes.



Graceful Volute (3.2") 8 cm
Cymbiolacca cracenta McMichael, 1963. Queensland, Australia. 20 to 50 m; uncommon.



Deshayes's Volute (3.5") 9 cm
Cymbiola deshayesi (Reeve, 1855). New Caledonia. Shallow water; moderately common.



Blood-red Volute (4") 10 cm
Cymbiola rutila (Broderip, 1826). N.E. Australia; New Guinea. On sand, shallow water; moderately common.



Beautiful Volute (3") 7.5 cm
Cymbiolacca pulchra (Sowerby, 1825). North Queensland. Sand, down to 60 m; common. Syn.: *woolacottae* McMichael.



Neilsen's Volute (3") 7.5 cm
Cymbiolacca pulchra color form *neilseni* McMichael, 1963. Australia. Uncommon.



Perry's Volute (3") 7.5 cm
Cymbiolacca pulchra color form *perryae* Ostergaard & Summers, 1957. Lacks dark spots. Holotype illustrated.



Dotted Volute (2.7") 7 cm
Cymbiolacca peristicta McMichael, 1963. N. Queensland, Australia. On sand, shallow water; uncommon.



Norris's Volute (3") 7.5 cm
Cymbiola rutila norrisi (Gray, 1838). Papua to Solomons. Shallow water; moderately common. Syn.: *ruckeri* Crosse.



Entangled Volute (3") 7.5 cm
Cymbiolacca perplicata (Hedley, 1902). Coral Sea; N.E. Australia. Offshore; rare.



Sophia's Volute (2.5") 6.5 cm
Cymbiola sophia (Gray, 1846). Northern Australia; Arafura Sea. On mud to 40 m; moderately common.



Irvin's Volute (4") 10 cm
Cymbiola irvinae (E. A. Smith, 1909). Western Australia. On sand and shells, 50 to 150 m; moderately rare.



Snowy Volute (2.5") 6.5 cm
Cymbiola nivosa (Lamarck, 1804). Western Australia. On sand to 40 m; common. Spines solid.



Erased Volute (2.5") 6.5 cm
Cymbiola nivosa form *oblita* (E. A. Smith, 1909). Western Australia. Spines on shoulder. Uncommon.



Bat Volute (3") 8 cm
Cymbiola vespertilio (L., 1758). Philippines to N. Australia. On mud to 20 m; common. Syn.: *mitis* and *serpentina* Lamarck.



Angular Volute (6") 15 cm
Zidona dufresnei (Donovan, 1823). Rio de Janeiro to central Argentina. 40 to 80 m; common. Syn.: *angulata* Swainson.



Maidservant Volute (6") 15 cm
Adelomelon ancilla (Lightfoot, 1786). Uruguay and Argentina. Offshore; uncommon. Syn.: *barattinii* Klap. & Ureta.



Beck's Volute (14") 35 cm
Adelomelon beckii (Broderip, 1836). Brazil; Argentina. Sand and mud to 64 m; uncommon. Syn.: *fusiformis* Kiener.



Magellanic Volute * (7") 19 cm
Odontocymbiola magellanica (Gmelin, 1791). Argentina; Chile. Offshore; locally common. Many synonyms.



Rios's Volute * (8") 20 cm
Adelomelon riosi Clench & Turner, 1964. Argentina. Dredged, 50 to 200 m; rare. Holotype illus.



Brazilian Volute * (6") 15 cm
Adelomelon brasiliiana (Lamarck, 1811). Southern Brazil; Argentina. Sand or mud to 70 m; common.



Cotton's Volute (12") 30 cm
Cottonia nodiplicata (Cox, 1910). W. and S. Australia. Offshore in 4 to 210 m; uncommon. Syn.: *dannevigi* Verco.



American Volute (2") 5 cm
Odontocymbiola americana (Reeve, 1856). Central Brazil. Offshore in 10 to 80 m; uncommon. Syn.: *cleryana* Petit.



Magellanic Volute (7") 19 cm
Odontocymbiola magellanica (Gmelin, 1791). Argentina; Chile. Offshore; locally common. Many synonyms.



Pescal Volute (4") 10 cm
Odontocymbiola pescalia Clench and Turner, 1964. Argentina. Offshore, deep water; rare. Holotype illustrated.



Alarcon Volute (2.5") 6 cm
Miomelon alarconi Stuardo & Villas, 1974. Chile. Offshore in deep water; rare. Holotype illustrated.



Spartan Volute (3") 8 cm
Tractolira sparta Dall, 1896. Gulf of Panama to West Mexico. Abyssal; rare. Holotype illustrated.



Bednall's Volute (4") 10 cm
Volutoconus bednalli (Brazier, 1878). Northern Territory, Australia. On sand, 10 to 40 m; moderately rare.



Cone-shaped Volute (2.7") 7 cm
Volutoconus coniformis (Cox, 1871). Northwestern Australia. Littoral to 20 m; rare.



Gross's Volute (4") 10 cm
Volutoconus grossi (Iredale, 1927). New South Wales and Queensland. 50 to 100 m; moderately rare.



Hargreaves's Volute (3.5") 10 cm
Volutoconus hargreavesi (Angas, 1872). Western Australia. 40 to 240 m; rare. Syn.: *daisyae* Weaver.



Kreusler's Volute (3.2") 8 cm
Notovoluta kreuslerae (Angas, 1865). South Australia. Sand and rubble, 14 to 160 m; moderately rare.



Hunter's Volute (5.5") 14 cm
Cymbiolista hunteri Iredale, 1931. East Australia. 10 to 150 m; common. Syn.: *marmorata* Swainson.



Arab Volute (6") 15 cm
Alcithoe arabica (Gmelin, 1791). New Zealand. Offshore; moderately common. Syn.: *jaculoides* Powell.



Swainson's Volute (8") 20 cm
Alcithoe swainsoni Marwick, 1926. New Zealand. 8 to 100 m; common. Syn.: *elongata* Swainson; *ostenfeldi* Iredale.



Calva Volute (8") 20 cm
Alcithoe swainsoni form *calva* Powell, 1928. New Zealand. Offshore; deep water. A smooth form.



Fusus Volute (3") 8 cm
Alcithoe fusus (Quoy & Gaimard, 1833). New Zealand. Offshore; 6 to 120 m; uncommon. Syn.: *gracilis* Swainson.



Laroche's Volute (4") 10 cm
Alcithoe larochei Marwick, 1926. North Island; New Zealand. 60 to 700 m; uncommon.



Pratas Volute (3") 7.5 cm
Sigaluta pratasensis Rehder, 1967. Off Pratas Island, China Sea. 600 m; rare. Holotype illustrated.



Cukri Volute (3") 7.5 cm
Sigaluta cukri Rokop, 1972. Off Baja California; Mexico. Deep water, very rare. Holotype illustrated.



Knox's Volute (3") 7.5 cm
Teremelon knoxi Dell, 1956. South Island, New Zealand. 400 to 700 m; rare.



Vexillate Volute (3") 7.5 cm
Harpulina arausiaca (Lightfoot, 1786). Ceylon and South India. Offshore to 10 m; uncommon. Syn.: *vexillum* Gmelin.



Brown-lined Volute (3") 7.5 cm
Harpulina lapponica (L., 1767). Sri Lanka; southern India. Offshore; common. Syn.: *interpuncta* Reeve.



Astonishing Volute (4.5") 11 cm
Iredalina mirabilis Finlay, 1926. New Zealand. 300 to 800 m; rare. Syn.: *aurantia* Powell.



Cordero's Volute (2") 5 cm
Provocator corderoi Carcelles, 1947. S. Uruguay to Patagonia. 2 to 250 m; rare.



Polished Volute (3") 7.5 cm
Fulgoraria leviuscula Rehder, 1969. Off Pratas Island, China Sea. 310 m; rare. Holotype illustrated.



Davies's Volute (5") 13 cm
Fulgoraria daviesi (Fulton, 1938). Shikoku Island, Japan. 150 to 250 m; common.



Kaneko Volute (5") 13 cm
Fulgoraria kaneko Y. Hirase, 1922. Japan to Chekiang Province, China. 150 to 300 m; rare. Syn.: *hayashii* Habe & Ito.



Humerose Volute (4") 10 cm
Fulgoraria humerosa Rehder, 1969. South China Sea. 300 m; rare. Holotype illus.



Cancellate Volute (4") 10 cm
Fulgoraria cancellata Kuroda & Habe, 1950. Off central Japan in 200 m; moderately common.



Clara Volute (4") 10 cm
Fulgoraria clara (Sowerby, 1914). Off Honshu Island, Japan in 10 to 400 m; moderately common.



Hamilie's Volute (5") 13 cm
Fulgoraria hamillei (Crosse, 1869). Taiwan; Japan. Sand or sandy clay, offshore. Uncommon.



Delicate Volute (2") 5 cm
Fulgoraria delicata (Fulton, 1940). Japan. 150 to 400 m; common. Paratype illustrated.



Hirase's Volute (6") 15 cm
Fulgoraria hirasei (Sowerby, 1912). Japan. Offshore. Common. Sold in Honshu fish markets.



Asian Flame Volute (4") 10 cm
Fulgoraria rupestris (Gmelin, 1791). Taiwan; China. Uncommon. Syn.: *fulminata* Lamarck; *aurantia* Shikama & Kosuge.



Stearns's Volute (5") 13 cm
Arctomelon stearnsii Dall, 1872. Alaska. Offshore in 50 to 200 m; locally common.



Gunther's Volute (1.5") 4 cm
Paramoria guntheri (E. A. Smith, 1886). Southern Australia. 40-80 m; moderately rare. Syn.: *adcocki* Tate.



Dampier's Volute (1.2") 3 cm
Amoria dampieria Weaver, 1960. Western Australia. Off-shore; uncommon.



Pretext Volute (2.5") 6 cm
Amoria praetexta (Reeve, 1849). Western Australia. Subtidal to 50 m on sand; uncommon.



Channeled Volute (2.5") 6 cm
Amoria canaliculata (McCoy, 1869). Queensland. On coral and sand, to 150 m; uncommon. Syn.: *harfordi* Cox.



Damon's Volute (4") 10 cm
Amoria damonii Gray, 1864. Northern Australia. Littoral to 10 m; common. Syn.: *reevei* Sowerby; *keatsiana* Ludbrook.



Elliot's Volute (3.5") 8.5 cm
Amoria ellioti (Sowerby, 1864). Western Australia. In sand, low-tide level. Moderately common.



Gray's Volute (3") 7.5 cm
Amoria grayi Ludbrook, 1953. Northern Territory to Western Australia. Offshore to 50 m; moderately common.



Carol's Volute (2.5") 6.5 cm
Amoria maculata (Swainson, 1822). Queensland, Australia. Littoral to 80 m; common. Syn.: *caroli* Iredale.



Turner's Volute (2") 5 cm
Amoria turneri (Griffith & Pidgeon, 1834). Northern Australia. 10 to 40 m; common. Syn.: *normaniae* Cotton.



MacAndrew's Volute (3") 7.5 cm
Amoria macandrewi (Sowerby, 1887). Barrow Island, Australia. Shallow water. Uncommon. Holotype illus.



Desirable Volute (3.5") 9 cm
Amoria exoptanda (Reeve, 1849). South Australia. On gravel, 12 to 20 m; rare.



Sclater's Volute (4") 10 cm
Amoria sclateri (Cox, 1869). Bass Straits, Tasmania. Off-shore, 40 to 60 m; uncommon. Syn.: *kingi* Cox.



Wavy Volute (3.5") 9 cm
Amoria undulata (Lamarck, 1804). S. Australia; Tasmania. On sand to 50 m; common. Syn.: *angasi* Sowerby.



Lorois's Volute (3") 8 cm
Harpulina loroisi Valenciennes, 1863. Ceylon and southern India. Offshore. Uncommon.



Fire-mouth Volute (3") 8 cm
Fusivoluta pyrrostoma (Watson, 1882). South Africa. Offshore from 80 to 400 m; uncommon.



Barnard's Volute (4") 10 cm
Fusivoluta barnardi Rehder, 1969. Natal to Mozambique. Offshore, 40 to 700 m; uncommon. Paratype illus.



Barry Clarke's Volute (4") 10 cm
Fusivoluta clarkei Rehder, 1969. Off Mozambique in 480 to 600 m; uncommon. Paratype illustrated.



De la Torre's Volute (4") 10 cm
Volutifusus torrei (Pilsbry, 1937). Cuba. Offshore, 20 to 400 m; rare. Paratypes.



Aguayo's Volute (4.5") 11.3 cm
Volutifusus aguayoi (Clench, 1940). Off east coast of Florida. Deep water. Rare. Holotype illus.



The Junonia (4") 10 cm
Scaphella junonia (Lamarck, 1804). S.E. United States. Offshore. Uncommon. Syn.: *johnstoneae* Clench (darker form).



Butler's Junonia (4.5") 11 cm
Scaphella junonia subspecies *butleri* Clench, 1953. Gulf of Campeche, Mexico. Locally uncommon offshore.



Dohrn's Volute * (4") 10 cm
Scaphella gouldiana form *dohrni* (Sowerby, 1903). S.E. United States, offshore, 80 to 1,000 m; uncommon.



Kiener's Volute (8") 20 cm
Scaphella dubia subspecies *kieneri* Clench, 1946. Northern areas of the Gulf of Mexico in 100 to 200 m; locally common.



Neptune Volute (2") 5 cm
Scaphella neptunia (Clench & Aguayo, 1940). South of Jamaica. 600 m; rare. Illustrated holotype is immature.



Evelyn's Volute (7") 18 cm
Scaphella evelina Bayer, 1971. Lower Caribbean. Deep water to 641 m; rare. Holotype (9 cm) illustrated.



Gould's Volute (4") 10 cm
Scaphella gouldiana (Dall, 1887). Off south Florida. Banded form rare. Variable.



Atlantis Volute (3") 7.5 cm
Scaphella gouldiana form *atlantis* Clench, 1946. Off Cuba, deep water; rare.



Cuban Volute (2.5") 6 cm
Scaphella gouldiana form *cuba* Clench, 1946. Off Cuba, deep water. Holotype illustrated.



Dubious Volute * (6") 15 cm
Scaphella dubia (Broderip, 1827). S.E. United States. 50 to 300 m; uncommon. Syn.: *schmitti* Bartsch.



Gilchrist's Volute (7") 18 cm
Neptuneopsis gilchristi (Sowerby, 1898). South Africa. 33 to 250 m; moderately common.



Spotted Flask (2.5") 6.5 cm
Ampulla priamus (Gmelin, 1791). Portugal to N.W. Africa. 50 to 300 m; uncommon. Syn.: *stercuspulicum* Gmelin.



Tibia Volute (2.4") 6 cm
Teramachia tibiaeformis Kuroda, 1931. Southern Japan. Offshore to 300 m; uncommon. Genus in Turbinellidae.



The Williams's Volute (5") 13 cm
Teramachia johnsoni form *williamsorum* Rehder, 1972. (holotype) S.W. Pacific. Deep water.



Dall's Volute (8") 20 cm
Teramachia dalli (Bartsch, 1942). Central Philippines. Deep water to 800 m; rare. Holotype illus.



Smith's Volute (6") 15 cm
Teramachia smithi (Bartsch, 1942). Central Philippines. Deep water in 500 to 860 m; very rare. Holotype illus.



Chestnut Volute (2") 4.8 cm
Calliotectum vernicosum Dall, 1890. Ecuador and Galapagos Islands. Deep water. Rare.



False Melon Volute (10") 26 cm
Livonia mammilla (Sowerby, 1844). S.E. Australia. Dredged, to 200 m; uncommon. Syn.: *leucostoma* Mayblom.



Slim Benthovolute (3") 7.5 cm
Benthovoluta gracilior Rehder, 1967. Philippine Islands. Deep water in 1,000 m; rare. Holotype illustrated.



Cortez's Volute (3") 7.5 cm
Surculina cortezi (Dall, 1908). Off southern California. Deep water in 1,900 m; rare. Holotype illus. Family Turbinellidae.



Alaska Miter-volute (2") 5 cm
Volutomitra alaskana Dall, 1902. Alaska to California. Offshore to 160 m; rare. Holotype illus. Family Volutomitridae.



Erebus Miter-volute (2") 5 cm
Volutomitra erebus Bayer, 1971. Off East Colombia. Deep water; rare. Holotype illustrated.



Persephone Miter-volute (2") 5 cm
Volutomitra persephone Bayer, 1971. Gulf of Panama. Deep water; rare. Holotype illustrated.

THE NUTMEGS FAMILY CANCELLARIIDAE

The cancellarias are mainly tropical in distribution with many interesting variations in shape. The columella bears several strong, slanting plicae. There is no operculum. Most specimens illustrated here are from the collection of Richard E. Petit.



Common Nutmeg (1.5") 3 cm
Cancellaria reticulata (L., 1767). S.E. United States to Brazil. Subtidal to 30 m; common. Rarely albino.



Adele's Nutmeg (1.5") 3 cm
Cancellaria reticulata subspecies *adela* Pilsbry, 1940. Florida Keys. Shallow water; uncommon. Paratype illus.



Scaled Nutmeg (0.6") 1.5 cm
Scalptia scalata (Sowerby, 1833). Indian Ocean. Offshore, shallow water; common.



Elegant Nutmeg (1.5") 4 cm
Cancellaria elegans Sowerby, 1821. Australia to Philippines. Shallow water; uncommon.



Oblong Nutmeg (1.2") 3 cm
Cancellaria oblonga Sowerby, 1825. Indo-Pacific. Offshore; uncommon. Syn.: *bifasciata* Deshayes.



Reeve's Nutmeg (1.5") 4 cm
Cancellaria reeveana Crosse, 1861. Japan to Philippines. Offshore to 10 m; common.



Chinese Nutmeg (1.5") 4 cm
Cancellaria sinensis Reeve,
1856. East Asia. Offshore to 30
m; common.



Knobbed Nutmeg (1.5") 4 cm
Cancellaria nodulifera Sowerby,
1825. Japan. Offshore,
shallow water; uncommon.



Spengler's Nutmeg (2") 5 cm
Cancellaria spengleriana
Deshayes, 1830. Japan. Off-
shore to 20 m; common.



Scalariform Nutmeg
(0.7") 1.8 cm
Scalptia scalariformis (Lamarck,
1822). Australia. Shallow water;
locally common.



Granular Nutmeg (1") 2.5 cm
Cancellaria granosa Sowerby,
1832. South Australia and Tas-
mania. Shallow water; com-
mon.



Western Nutmeg (1") 2.5 cm
Cancellaria westralis Garrard,
1975. Australia. Shallow water;
locally common.



Spiral Nutmeg (1.3") 3 cm
Cancellaria spirata Lamarck,
1822. Australia. Shallow water;
locally common.



Amasia Nutmeg (0.7") 1.8 cm
Scalptia amasia (Iredale, 1930).
Australia. Offshore; locally
common.



Fearful Nutmeg (1") 2.5 cm
Cancellaria anxifer Iredale,
1925. East Australia. Offshore to
60 m; locally common.



Milky Nutmeg (1.5") 4 cm
Cancellaria lactea Deshayes,
1830. South Australia; Tasma-
nia. Offshore; common.



Similar Nutmeg (1") 2.5 cm
Cancellaria similis Sowerby,
1833. Mediterranean and West
Africa. Common.



Cancellate Nutmeg (1.2") 3 cm
Cancellaria cancellata (L.,
1767). West Africa. Shallow wa-
ter to 10 m; common.



Funnel Nutmeg (0.8") 2 cm
Olssonella funiculata (Hinds, 1843). West Mexico to Panama. Offshore; uncommon.



Fisherman's Nutmeg (1") 2.5 cm
Cancellaria piscatoria (Gmelin, 1791). West Africa. Subtidal to 5 m; locally common.



Dim Nutmeg (1") 2.5 cm
Cancellaria urceolata Hinds, 1843. West Mexico to Ecuador. Offshore to 73 m; common.



White Nutmeg (1") 2.5 cm
Cancellaria albida Hinds, 1843. West Mexico to Ecuador. Offshore to 128 m; moderately common.



Obese Nutmeg (2") 5 cm
Cancellaria obesa Sowerby, 1832. West Mexico to Ecuador. Intertidal to 90 m; common. Syn.: *acuminata* Sowerby.



Helmet Nutmeg (1.2") 4 cm
Cancellaria cassidiformis Sowerby, 1832. Gulf of California to Peru. Intertidal to 37 m; common.



Solid Nutmeg (1") 2.5 cm
Cancellaria solida Sowerby, 1832. West Mexico to Peru. Offshore to 37 m; common.



Cuming's Nutmeg (1.7") 4.5 cm
Cancellaria cumingiana Petit, 1844. West Mexico. Offshore; rare.



Toothed Nutmeg (1") 2.5 cm
Cancellaria indentata Sowerby, 1832. West Mexico to Ecuador. Offshore to 110 m; common.



Jewel Nutmeg (0.6") 1.5 cm
Cancellaria gemmulata Sowerby, 1832. West Mexico to Panama; Galapagos. Offshore to 73 m; uncommon.



Blood-mouthed Nutmeg (1") 2.5 cm
Cancellaria haemastoma Sowerby, 1832. Galapagos Islands; uncommon.



Balboa Nutmeg (1.5") 4 cm
Cancellaria balboae Pilsbry, 1931. West Mexico to Panama. 18 to 53 m; uncommon.



Jay's Nutmeg (0.7") 1.8 cm
Cancellaria jayana Keen, 1958.
West Mexico to Panama. Off-
shore to 75 m; common.



Cooper's Nutmeg (3") 7 cm
Cancellaria cooperi Gabb, 1865.
California to West Mexico. Off-
shore to 600 m; uncommon.



Crawford's Nutmeg (2") 5 cm
Cancellaria crawfordiana (Dall,
1891). California. 30 to 400 m;
uncommon.



Crawford's Nutmeg (2") 5 cm
Cancellaria crawfordiana (Dall,
1891). Holotype specimen from
off Drake's Bay, California, 48
m.



Io Nutmeg (1.5") 4 cm
Cancellaria io Dall, 1896. Gulf of
California. 600 m; rare. Holo-
type illustrated.



Club Nutmeg (1") 2.5 cm
Cancellaria clavata Sowerby,
1832. West Mexico to Peru. Off-
shore to 110 m; common. Syn.:
elata Hinds, 1843.



Habe's Nutmeg (0.7") 1.8 cm
Nipponaphera habei Petit,
1972. Japan to Taiwan. Off-
shore; uncommon.



Half-clear Nutmeg (0.5") 1.2 cm
Nipponaphera semipellucida
(Adams and Reeve, 1850). Ja-
pan. Offshore; uncommon.



Bayer's Nutmeg (0.8") 2 cm
Admetula bayeri Petit, 1976. Off
Yucatan, Mexico. Deep water;
rare. Holotype illustrated.



Campbell's Nutmeg
(0.7") 1.8 cm
Olssonella campbelli Shasky,
1961. West Mexico. 18 to 91 m;
uncommon.



Tabulate Nutmeg * (1") 2.5 cm
Scalptia contabulata (Sowerby,
1833). Indo-West Pacific. Subti-
dal; common. Syn.: *mon-
trouzieri* Souverbie.



Oblique Nutmeg (1") 2.5 cm
Scalptia obliquata (Lamarck,
1822). Indo-Pacific. Few-ribbed
variety; moderately common.



Two-color Nutmeg (0.7") 1.8 cm
Scalptia bicolor (Hinds, 1843).
Indo-Pacific. Subtidal; common.



Lamellose Nutmeg (0.5") 1.2 cm
Scalptia lamellosa (Hinds, 1843). Indo-Pacific. Offshore; uncommon.



Textured Nutmeg (1") 2.5 cm
Scalptia textilis (Kiener, 1841). Indo-Pacific. Shallow water; uncommon.



Crosse's Nutmeg (0.8") 2.1 cm
Scalptia crossei (Semper, 1861). S.W. Pacific. Shallow water; locally common. Syn.: *serrata* Reeve.



Scaled Nutmeg (0.7") 1.8 cm
Scalptia scalarina (Lamarck, 1822). Indo-Pacific. Shallow water; common.



Hollow Nutmeg (1") 2.5 cm
Scalptia foveolata (Sowerby, 1848). South Africa. Offshore; common.



Disjunct Nutmeg (1") 2.5 cm
Trigonostoma semidisjuncta (Sowerby, 1848). South Africa. Offshore; common.



Strong's Nutmeg (0.5") 1.2 cm
Agatrix strongi (Shasky, 1961). Gulf of California. Offshore, deep water; rare.



Triangular Nutmeg (1") 2.5 cm
Trigonostoma pellucida (Perry, 1811). S.W. Pacific. Offshore, shallow water; rare. Syn.: *trigonostoma* Lamarck.



Antique Nutmeg (0.7") 1.8 cm
Trigonostoma antiquata (Hinds, 1843). Australia to Japan. Offshore; rare.



Laseron's Nutmeg (0.5") 1.2 cm
Trigonostoma laseroni (Iredale, 1936). Australia. Shallow water; locally common.



Philippi's Nutmeg (1") 2.5 cm
Trigonostoma tenerum (Philippi, 1848). S. Florida. Offshore, shallow water; uncommon. Syn.: *stimpsoni* Calkins.



Amakusa Nutmeg (0.7") 1.8 cm
Scalptia amakusana (Petit, 1974). Japan. Shallow water; locally common.



Withrow's Nutmeg (1") 2.5 cm
Scalptia withrowi (Petit, 1976). West Africa. Shallow water; locally common.



Angle-mouth Nutmeg (1") 2.5 cm
Trigonostoma goniostoma (Sowerby, 1832). W. Mexico to Panama. Intertidal to 5 m; common.



Little Elegant Nutmeg (0.4") 1 cm
Trigonostoma elegantulum M. Smith, 1947. West Mexico to Ecuador. Offshore; uncommon.



Bubble Nutmeg (1.2") 3 cm
Trigonostoma bullatum (Sowerby, 1832). West Mexico to Panama. Offshore to 82 m; common.



Miller's Nutmeg (1") 2.5 cm
Trigonostoma milleri Burch, 1949. Costa Rica; Galapagos. Offshore to 30 m; uncommon. Holotype illus.



Miller's Nutmeg (1") 2.5 cm
Trigonostoma milleri Burch, 1949. Variation in shape in a specimen from the Galapagos.



Mercado's Nutmeg (1.3") 3 cm
Scalptia mercadoi (Old, 1968). Philippines. Offshore; uncommon to rare.



Tessellate Nutmeg (1") 2.5 cm
Aphera tessellata (Sowerby, 1832). West Mexico to Peru. Offshore; uncommon. Type of subgenus *Aphera*.



Miter-shaped Nutmeg (1") 2.5 cm
Narona mitriformis (Sowerby, 1832). Panama to Peru. Subtidal to 37 m; uncommon.



Basket Nutmeg (1") 2.5 cm
Cancellaria corbicula Dall, 1908. California. Deep water; rare. Holotype illustrated.



Big-spined Nutmeg (0.7") 1.8 cm
Fusiaphera macrospira (Adams & Reeve, 1850). S.W. Pacific to Japan. Offshore; uncommon.



Corrugated Nutmeg (0.7") 1.8 cm
Cancellaria corrugata Hinds, 1843. West Mexico to Ecuador. Offshore to 31 m; rare.



Banded Nutmeg (2") 5 cm
Gardiella cingulata Olsson & Bayer, 1972. Caribbean. Deep water; rare. Holotype illus.



Santa Nutmeg (1.5") 4 cm
Gardiella santa Olsson & Bayer, 1972. Florida Straits. Deep water; rare. Holotype illustrated.



Clark's Slim Nutmeg (1") 2.5 cm
Perplicaria clarki M. Smith, 1947. W. Mexico to Panama. Intertidal; rare.



Spiny Nutmeg (1") 2.5 cm
Cancellaria centrota Dall, 1896. W. Mexico to Panama. Offshore in 120 m; rare.



Lyrate Nutmeg (1") 2.5 cm
Cancellaria lyrata (Brocchi, 1814). West Africa. Subtidal; uncommon.



Gladiator Nutmeg (1.5") 4 cm
Cancellaria gladiator Petit, 1976. Galapagos Islands. 200 m; rare. Paratype illustrated.

MARGINELLAS FAMILY MARGINELLIDAE

One of the most beautiful families of the marine gastropods. Usually less than an inch in size, always highly polished, and with several strong teeth on the columella. Most of the 650 species live in sand in the tropics. West Africa has the most species. *Prunum*, *Glabella*, etc., are subgenera.



Pringle's Marginella (3") 7.5 cm
Afrivoluta pringlei Tomlin, 1947. South Africa. 100 to 300 m; uncommon. Originally considered a volute.



Desjardin's Marginella (2") 5 cm
Marginella desjardini Marche-Marchad, 1957. Ivory Coast, West Africa. Offshore to 100 m; uncommon.



Belcher's Marginella (1") 2.5 cm
Marginella belcheri Hinds, 1844. Mauritania; West Africa. Moderately deep water; uncommon.



Adanson's Marginella (1") 2.5 cm
Marginella adansoni Kiener, 1834. West Africa. Shallow water; uncommon. Syn.: *bifasciata* Sowerby.



Clery's Marginella (0.8") 2 cm
Marginella cleryi Petit, 1836.
Mauritania to Gambia.
Dredged in sand or mud, 20 m;
uncommon.



Golden Marginella (1") 2.5 cm
Marginella aurantia Lamarck,
1822. West Africa. Under rocks,
in sand, shallow water; moder-
ately uncommon.



Goodall's Marginella (1") 2.5 cm
Marginella goodalli Sowerby,
1825. West Africa. Offshore;
moderately common.



Cloudy Marginella (1.5") 4 cm
Marginella nebulosa (Röding,
1798). South Africa. Offshore to
75 m and beached; uncom-
mon. Syn.: *nubeculata* Lam.



Fringed Marginella (0.8") 2 cm
Marginella limbata Lamarck,
1822. Canary Is., West Africa.
Uncommon.



Spotted Marginella (0.8") 2 cm
Marginella persicula (L., 1758).
West Africa; Cape Verde Is-
lands. Moderately common.
Syn.: *guttata* Link.



Plain Marginella (1") 2.5 cm
Marginella cornea Lamarck,
1822. Mauritania to Dahomey.
Shallow water; moderately
common.



Girdled Marginella (1") 2.5 cm
Marginella cingulata (Dillwyn,
1817). West Africa. In sand or
mud; common. Syn.: *lineata*
Lamarck.



Almond Marginella
(0.6") 1.5 cm
Marginella amygdala Kiener,
1841. Mauritania to Rio Muni;
common. Syn.: *gambiensis*
Redfield.



Mosaic Marginella (1") 2.5 cm
Marginella mosaica Sowerby,
1846. South Africa. Offshore,
but usually found beached;
moderately uncommon.



Bland Marginella (1") 2.5 cm
Marginella blanda Hinds, 1844.
Senegal, West Africa. Off-
shore; uncommon.



Striped Marginella (1.5") 4 cm
Marginella strigata (Dillwyn,
1817). S.E. Asia. Shallow water;
uncommon. Syn.: *praeallosa*
Higgins.



Petit's Marginella (1.4") 3.5 cm
Marginella petittii Duval, 1841. West Africa. Moderately deep water; uncommon.



Sebastian's Marginella (1.5") 4 cm
Marginella sebastiani Marche & Rosso, 1979. Senegal. Offshore; moderately common. See also *desjardini*.



Glistening Marginella (1") 2.5 cm
Marginella irrorata Menke, 1828. West Africa. Offshore; moderately common. Like a small *M. glabella*.



Ermine Marginella (1.2") 3 cm
Marginella faba (L., 1758). West Africa; uncommon. Once a great rarity among collectors. Syn.: *erminea* Röding.



Toothed Marginella (1") 2.5 cm
Marginella denticulata (Link, 1807). West Africa. Moderately uncommon. Syn.: *bifasciata* Lamarck (a banded form).



Shiny Marginella (1.2") 3 cm
Marginella glabella (L., 1758). N.W. Africa; Cape Verde Islands. Offshore to 80 m; moderately common.



Queen Marginella (1.3") 3.5 cm
Marginella pseudofaba Sowerby, 1846. West Africa. Moderately deep water; rare. Syn.: *imperatrix* Sykes.



Cumings's Marginella (1") 2.5 cm
Marginella helmatina Rang, 1832. Gambia to Angola. Shallow water; uncommon. Syn.: *cumingiana* Petit.



Oliveline Marginella (0.7") 1.8 cm
Marginella olivaeformis Kiener, 1834. Senegal to Gold Coast. Moderately common. Syn.: *hindsiana* Petit.



Encircled Marginella (0.8") 2 cm
Marginella cincta Kiener, 1834. West Africa. Offshore at about 40 m; moderately uncommon.



Canary Marginella (0.8") 2 cm
Marginella canaryensis Clover, 1972. Off Canary Islands and Morocco. Trawled, 60-120 m; rare.



Harplike Marginella (1") 2.5 cm
Marginella harpaeformis Sowerby, 1846. West Africa; moderately uncommon. Similar to *M. faba* but smaller and spotted.



Music Marginella (0.7") 1.8 cm
Marginella musica Hinds, 1844. West Africa. Moderately deep water; rare. Close to *M. diadochus* but smaller.



Carmine Marginella (0.3") 7 mm
Marginella hematita Kiener, 1841. S.E. United States to Brazil. Uncommon; off-shore. Syn.: *philtata* M. Smith.



Hubert's Marginella (0.7") 1.8 cm
Marginella huberti Clover, 1972. Angola. In coral rubble at 30 m and beached; uncommon.



Atlantic Marginella (0.5") 1.2 cm
Marginella apicina Menke, 1828. S.E. United States and West Indies. Shallow water; common. About 1 in 5,000 sinistral.



Obese Marginella (0.7") 1.8 cm
Marginella obesa Redfield, 1846. Lower Caribbean; Brazil. Shallow water under rocks; uncommon. Syn.: *similis* Sowerby.



Storer's Marginella (0.6") 1.5 cm
Marginella storeria Couthouy, 1837. Gulf of Mexico. Moderately deep water; uncommon.



Largillier's Marginella (1") 2.5 cm
Marginella largillieri Kiener, 1841. Eastern Brazil. Offshore on sand, rocks or coral; rare.



Lilac Marginella (1") 2.5 cm
Marginella lilacina Sowerby, 1846. Northeastern Brazil. Offshore on sand and broken shells; uncommon.



Martin's Marginella (1.2") 3 cm
Marginella martini Petit, 1853. Off Rio de Janeiro, Brazil. Offshore on sand, 10 - 55 m; uncommon.



Roosevelt's Marginella (1") 2.5 cm
Marginella roosevelti Bartsch & Rehder, 1940. Caribbean; Bahamas. Deep water; rare. Large form of *M. carnea*?



Short-spined Marginella (0.8") 2 cm
Marginella curta Sowerby, 1832. Ecuador to Chile. In sand, 2 - 20 m; uncommon.



Stout Marginella (0.8") 2 cm
Marginella robusta Sowerby, 1904. Southern Atlantic; Ascension Island. Uncommon.



Orange Marginella (0.8") 2 cm
Marginella carnea Storer, 1837.
S.E. Florida, West Indies. Off-
shore in grass to 20 m; moder-
ately common.



Royal Marginella (1.2") 3 cm
Marginella labiata Kiener, 1841.
Yucatan to Central America;
West Indies. In sand at low
tide; moderately common.



White-spotted Marginella
(0.8") 2 cm
Marginella guttata (Dillwyn,
1817). S.E. Florida; West Indies.
Under rocks, shallow water.



Plum Marginella (1") 2.5 cm
Marginella prunum (Gmelin,
1791). Lower Caribbean to Bra-
zil. Common. Syn.: *caerules-
cens* Lamarck.



Matthews's Marginella (2") 5 cm
Marginella matthewsi Van Mol
& Tursch, 1967. N.E. Brazil. Off-
shore at about 25 m; moder-
ately rare.



Thick Marginella (1") 2.5 cm
Marginella marginata (Born,
1778). West Indies. In sand and
eel grass; common. Many syn-
onyms.



Orange-banded Marginella
(0.5") 1.2 cm
Marginella avena Kiener, 1834.
S.E. United States to Brazil.
Shallow water; common.



Delicate Marginella (1.2") 3 cm
Marginella sapotilla Hinds,
1844. Panama to Ecuador. In
sand or mud at low tide; com-
mon. Syn.: *burchardi* Dunker.



Maclean's Marginella
(1.8") 4.5 cm
Marginella macleani (Roth,
1978). Ecuador; rare. Holotype
illustrated.



Twinned Marginella
(0.5") 1.2 cm
Marginella accola (Roth &
Coan, 1968). Panama. Intertid-
al; rare. Type *M. porcellana*
(Gmelin) analog in Caribbean.



Anson's Marginella
(0.5") 1.2 cm
Marginella ansonae Clover,
1976. Madagascar. Shallow wa-
ter; uncommon.



Fly Marginella (0.5") 1.2 cm
Marginella muscaria Lamarck,
1822. Southern Australia; Tas-
mania. Low tide to 10 m; com-
mon. Syn.: *lactea* Hutton.



Narrow Marginella (1") 2.5 cm
Marginella angustata Sowerby, 1846. Sri Lanka. Offshore to deep water; common.



Fischer's Marginella (0.4") 1 cm
Marginella fischeri Bavay, 1902. Philippines. Offshore; uncommon.



Red Sea Marginella (1") 2.5 cm
Marginella obtusa Sowerby, 1846. Red Sea; north Arabian Sea. In sand and mud 20 - 80 m; uncommon. Syn.: *mirabilis* H. Adams.



Peppered Marginella (1") 2.5 cm
Marginella piperata Hinds, 1844. South Africa. Usually found beached; common. Syn.: *strigata* Sowerby.



Bairstow's Marginella (0.6") 1.6 cm
Marginella bairstowi Sowerby, 1886. South Africa. Usually found beached; moderately common. Like a small *M. mosaica*.



Woolly Marginella (1.2") 3 cm
Marginella floccata Sowerby, 1889. South Africa. On beaches; uncommon.



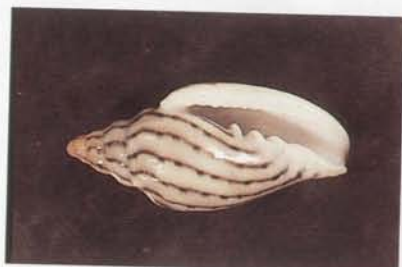
Rosy Marginella (1") 2.5 cm
Marginella rosea Lamarck, 1822. South Africa. On beaches; moderately common.



Wavy-line Marginella (1.2") 3 cm
Marginella lineolata Sowerby, 1886. South Africa. Offshore to 90 m; uncommon.



Brown-line Marginella (1") 2.5 cm
Marginella diadochus A. Adams & Reeve, 1848. South Africa. Dredged in deep water; rare.



Fettered Marginella (1") 2.5 cm
Marginella nodata Hinds, 1844. West Africa. Offshore; rare. Very few specimens in private collections.



Pink Marginella (0.8") 2 cm
Marginella pergrandis (Clover, 1974). South Arabian coast; Masirah Island; Gulf of Oman. On beaches; rare.



Elegant Marginella (1.8") 4.5 cm
Marginella elegans (Gmelin, 1791). Burma to S.W. Thailand. In sand 4 to 6 m; uncommon.



Ornate Marginella (1") 2.5 cm
Marginella ornata Redfield, 1870. South Africa. Usually found beached; moderately common. Syn.: *vittata* Reeve.



Broad Marginella (1") 2.5 cm
Marginella ventricosa G. Fischer, 1807. S.E. Asia; Indonesia. Shallow water, in mud; moderately common. Syn.: *quinqueplicata* Lamarck.



Four-lined Marginella (0.8") 2 cm
Marginella quadrilineata Gaskoin, 1849. Philippines; Northern Borneo. In sand and mud; uncommon.



Three-plaited Marginella (1") 2.5 cm
Marginella tricineta Hinds, 1844. Singapore to Taiwan. Offshore to 40 m; uncommon.



Broken-line Marginella (0.3") 7 mm
Marginella interruptolineata Mühlfeld, 1816. Lower Caribbean. Shallow water; common.



Sarda Marginella (1") 2.5 cm
Marginella sarda Kiener, 1834. Indian Ocean. Uncommon.



Finger Marginella (1") 2.5 cm
Marginella dactylus Lamarck, 1822. S.E. Asia; Indonesia. Uncommon.



Philippine Marginella (0.6") 1.5 cm
Marginella philippinarum Redfield, 1848. Philippines. Shallow water; common.

TURRIDS FAMILY TURRIDAE

Turrids form the largest of all molluscan families in number of species. Hallmark is a notch or sinus in upper part of outer lip. Found in all seas from shallow water to abyssal depths turrids have a well-developed poison gland associated with radula. Some harpoon prey in the manner of cone shells. Operculum sometimes present.



Wavy-line Turrid (1") 2.5 cm
Perrona lineata (Lamarck, 1816). West Africa to Cape of Good Hope. Offshore; uncommon. Wavy lines follow lines of growth.



Nifat Turrid (2") 5 cm
Perrona nifat (Bruguère, 1789). West Africa. Offshore; moderately common. A solid and heavy shell.



Obese Turrid (1.4") 3.5 cm
Perrona obesa (Reeve, 1842). Angola. Offshore; uncommon. Whorls markedly stepped.



Kiener's Turrid * (2.5") 6.5 cm
Gemmula kieneri (Doumet, 1840). Japan; China Sea; Philippines. Deep water; uncommon.



Melvill's Turrid (2.3") 6 cm
Gemmula congener cosmoi (Sykes, 1930). Japan. Dredged 100 - 200 m; uncommon.



Splendid Turrid (2.5") 6.5 cm
Gemmula speciosa (Reeve, 1843). Philippines; China Sea; Arabian Sea. Deep water; uncommon.



Deshayes's Turrid * (2.5") 6.5 cm
Gemmula deshayesii (Doumet, 1839). Japan; China; Hong Kong. Offshore; moderately common.



Atlantic Gem Turrid (2") 5 cm
Gemmula periscelida (Dall, 1889). West Indies; S.E. United States. From 200 m; rare. Holotype illus.



Albatross Turrid (3") 7.5 cm
Gemmula diomedea Powell, 1964. Philippines. Dredged 200 - 700 m; rare. Holotype illus.



Graeffe's Turrid (1") 2.5 cm
Gemmula graeffei (Weinkauff, 1875). Fiji; Queensland; Philippines. Offshore; moderately common.



Luzon Turrid (2") 5 cm
Pinguigemmula philippinensis Powell, 1964. Philippines. Deep water; rare. Holotype illus.



Tesch's Turrid (2") 5 cm
Ptychosyrinx timorensis teschi Powell, 1964. Indonesia. Deep water; rare. Holotype illus.



Indian Turrid (3.5") 9 cm
Lophiotoma indica (Röding, 1798). Sri Lanka to Australia; Fiji. Moderately deep water; uncommon.



Unedo Turrid * (3.5") 9 cm
Gemmula unedo (Kiener, 1839). Japan; Indonesia; Persian Gulf. Deep water; uncommon. Syn.: *invicta* Melvill.



Light-wine Turrid (2.2") 5.5 cm
Lophiotoma leucotropis (Adams & Reeve, 1850). Japan; Taiwan to Philippines. Offshore; uncommon.



Marbled Turrid * (1.8") 4.5 cm
Lophiotoma acuta (Perry, 1811). Indo-Pacific. Shallow water to 30 m; common. Dark form.



Keeled Turrid (1.3") 4.5 cm
Lophiotoma polytropia (Helbling, 1779). Philippines; Moluccas; New Caledonia. Offshore; uncommon.



White Giant Turrid (3.5") 9 cm
Polystira albida (Perry, 1811). South Florida to Texas; West Indies. 50 - 250 m; common. Syn.: *virgo* Lamarck.



Delicate Giant Turrid (3") 7.5 cm
Polystira tellea (Dall, 1889). Florida to Louisiana. Moderately deep water; moderately common.



Noble Giant Turrid (3.5") 9 cm
Polystira nobilis (Hinds, 1843). Gulf of California to Panama. Offshore to 165 m; uncommon.



Necklace Turrid (2") 5 cm
Xenoturris cingulifera (Lamarck, 1822). Tropical Indo-Pacific. Shallow and deeper water; common.



Speckled Turrid (1.5") 4 cm
Xenoturris millepunctata (Sowerby, 1908). South Pacific; Japan. Tidal flats and offshore; uncommon.



Babylonia Turrid (3") 7.5 cm
Turris babylonia (L., 1758). Tropical Pacific (not Australia). Shallow and deeper water; uncommon.



Supreme Turrid (6") 15 cm
Turris crisa crisa (Lamarck, 1816). Indo-Pacific. Offshore; uncommon. Largest of living turrids.



Intricate Turrid (1.8") 4.5 cm
Turris crisa intricata Powell, 1964. Hawaiian Islands. 8 - 60 m; rare. Holotype illus.



Large Perverse Turrid (2") 5 cm
Antiplanes major Bartsch, 1944. California. 80 - 600 m; common. Always sinistral. Holotype illus.



Crested Turrid (1") 2.5 cm
Turridrupa bijubata (Reeve, 1843). Tropical Indo-Pacific. Intertidal; moderately common.



Kaderly's Turrid (3") 7.5 cm
Comitas kaderlyi (Lischke, 1872). Japan to Philippines. Dredged 140 to 1600 m; uncommon.



Miter-shaped Turrid (1.5") 3 cm
Genota mitriformis (Wood, 1828). West Africa. Offshore; uncommon. Syn.: *mitraeformis* Kiener.



Surinam Turrid (1.3") 3.5 cm
Fusiturricula jaquensis (Sowerby, 1850). Surinam; Brazil. Moderately deep water; rare.



Fenimore's Turrid (2") 5 cm
Fusiturricula fenimorei Bartsch, 1934. Puerto Rico. Deep water; rare.



Wax-beaded Turrid (2.5") 6.5 cm
Leucosyrinx tenoceras Dall, 1889. S.E. United States; Lesser Antilles. 1000 to 1500 m; rare. Holotype illus.



Olivaceous Knefastia (1.8") 4.5 cm
Knefastia olivacea (Sowerby, 1833). Gulf of California to Ecuador. Offshore; common.



Elegant Star Turrid (1.8") 4.5 cm
Cochlespira elegans (Dall, 1881). Cuba; Florida. Dredged 60-400 m; rare. Formerly *Ancistosyrinx*.



Dull Star Turrid (2") 5 cm
Cochlespira pulchella semipolita Powell, 1969. Philippines. Deep water; rare. Holotype illus.



Goode's Turrid (3.5") 9 cm
Aforia goodei (Dall, 1890). Western Americas. Deep water; uncommon. Syn.: *persimilis* Dall (holotype illus.).



Ridged Turrid (3") 7.5 cm
Aforia circinata (Dall, 1873). Bering Sea; Alaska to Japan. Deep water; uncommon. Syn.: *diomedea* Bartsch.



Ringed Turrid (2.9") 7.5 cm
Phymorhynchus cingulatus (Dall, 1890). Galapagos. Dredged at about 2,400 m; rare. Holotype illustrated.



Cadenas's Turrid (1.5") 4 cm
Clavus cadenasi (Clench & Aguayo, 1939). Off Cuba. Deep water; rare. Holotype illus. Is *johnsoni*?



Johnson's Turrid (1.5") 4 cm
Clavus johnsoni (Bartsch, 1934). Puerto Rico. Deep water; rare. Holotype illustrated.



Baird's Turrid (1.4") 3.5 cm
Pleurotomella bairdii Verrill & Smith, 1884. Off Delaware and Chesapeake Bays. Dredged about 3,250 m; rare.



Hadria Turrid (1.2") 3 cm
Pleurotomella hadria Dall, 1889. Off North Carolina. 800 to 1500 m; rare. Holotype illus.



Graceful Atlantic Turrid (1") 2.5 cm
Pleurotomella chariessa Watson, 1881. North Atlantic to off North Carolina. 1,000 m; rare.



Carpenter's Turrid (2.5") 6.5 cm
Megasurcula carpenteriana (Gabb, 1865). California to Baja California. Offshore to 480 m on mud; common.



Carpenter's Turrid (2.5") 6.5 cm
Megasurcula carpenteriana (Gabb, 1865). Described under other names, including *tremperiana* Dall (holotype illus.).



Pink Turrid (1.2") 3 cm
Phenatoma novaezelandiae (Reeve, 1843). New Zealand. Shallow to deep water on sand; uncommon.



Brown-banded Turrid (1.5") 4 cm
Bathytoma viabrunnea (Dall, 1889). S.E. Florida; West Indies. 200 to 700 m; rare.



Two-edged Turrid (1.5") 3 cm
Clavatula bimarginata (Lamarck, 1822). West Africa. Offshore; uncommon.



Ima's Turrid (2") 5 cm
Imaclava ima (Bartsch, 1944). Gulf of California. Offshore; rare. Holotype illustrated.



Lean Turrid (1.5") 4 cm
Hindsiclava alesidota (Dall, 1889). North Carolina to Florida; Barbados. 50 to 150 m; uncommon. Syn.: *macilenta* Dall.



Jeffreys's Turrid (1.2") 3 cm
Clathrodrillia jeffreysii (E. A. Smith, 1875). Japan. Offshore; uncommon.



Lavinia Turrid (2") 5 cm
Ptychobela lavinia (Dall, 1919).
West Mexico to Peru. Habitat
unknown; rare. Holotype illus.



Saddened Turrid (1") 2.5 cm
Compsodrillia tristicha (Dall,
1889). Gulf of Mexico. Deep
water; rare. Holotype illus.



Muricate Turrid (1") 2.5 cm
Clavatula muricata (Lamarck,
1822). West Africa. Offshore;
locally uncommon.



Gaboon Turrid (1.4") 3.5 cm
Clavatula gabonensis Melvill,
1923. Senegal. Offshore; un-
common.



Little-dog Turrid (1") 2.5 cm
Clavus canicularis (Röding,
1798). Western Pacific. Shallow
water; uncommon. Syn.: *auric-
ulifera* Lamarck.



Brown-spot Turrid (2") 4.7 cm
Imaclava unimaculata (Sow-
erby, 1834). West Mexico to Co-
lombia. 20 to 70 m; uncom-
mon.



Diadem Turrid (1.2") 3 cm
Clavatula diadema (Kiener,
1840). West Africa. Offshore;
uncommon.



One-zoned Turrid (0.8") 2 cm
Clavus unizonalis (Lamarck,
1822). Western Pacific. Shallow
water; common.



Enna Turrid (1") 2.5 cm
Clavus enna Dall, 1918. Philip-
pines; S.W. Pacific. Uncom-
mon. Syn.: *unifasciata* E. A.
Smith, not Deshayes.



Exasperating Turrid
(0.6") 1.5 cm
Austroclavus exasperatus
(Reeve, 1843). Indian Ocean. 1
to 30 m; uncommon.



Rose-tinted Turrid (1.5") 4 cm
Clavus rosalinus Marrat, 1877.
West Africa. Offshore; uncom-
mon.



Bayer's Turrid (1") 2.5 cm
Glyphostoma bayeri Olsson,
1971. Gulf of Panama. Deep wa-
ter; rare. Holotype illustrated.



Mottled Turrid (1") 2.5 cm
Pilsbryspira amathea (Dall, 1919). West Mexico. Among rocks at low tide; common. Holotype illus.



Janet's Turrid (1") 2.5 cm
Splendrillia janetae Bartsch, 1934. Gulf of Mexico; West Indies. Deep water; rare. Holotype illus.



Two-toned Turrid (1") 2.5 cm
Carinodrillia dichroa Pilsbry & Lowe, 1932. Gulf of California to Ecuador. On gravel 10 to 40 m; uncommon.



Tampa Turrid (0.8") 2 cm
Crassispira tampaensis Bartsch & Rehder, 1939. S.W. Florida. Offshore; uncommon. Paratype illus.



Sanibel Turrid (1") 2.5 cm
Crassispira sanibelensis Bartsch & Rehder, 1939. West Florida; Bahamas. Offshore; uncommon. Holotype illus.



Javelin Turrid (0.8") 2 cm
Compsodrillia jaculum (Pilsbry & Lowe, 1932). West Mexico to Panama. Offshore 10 to 40 m; uncommon.



Turned Turrid (3") 7.5 cm
Turricula tornata (Dillwyn, 1817). India to Thailand. Offshore to 35 m on mud; uncommon. Syn.: *flammea* Schum.



Java Turrid (2.5") 6.5 cm
Turricula javana (L., 1758). Indo-W. Pacific; Japan. Shallow and deeper water on mud; common.



Kamakura Turrid (2") 5 cm
Comitas kamakurana (Pilsbry, 1895). Japan. Offshore; uncommon. Syn.: *laysanica* Dall.



Wrinkled Turrid (1.8") 4.5 cm
Fusiturris undatiruga (Bivona, 1832). Mediterranean. Moderately deep water; uncommon.



Remarkable Turrid (3.5") 9 cm
Nihonia mirabilis (Sowerby, 1914). Japan. Moderately deep water; rare.



Japanese Wonder Shell (3.5") 9 cm
Thatcheria mirabilis Angas, 1877. Japan to Philippines. Deep water; common. In family Thatcheriidae.

CONES FAMILY CONIDAE

Primarily inhabitants of warm, shallow water, cones are most numerous in the tropical Indo-Pacific. The poison of some cones may be lethal to humans. A diminutive operculum is usually present. Eggs are deposited in purse-shaped capsules. More than 300 cone species are recognized, but many synonyms have been created.

INDO-PACIFIC and JAPANESE CONES

The richest area in species of cones is the tropical Western Pacific and Indian Oceans. Many deep-water species are yet to be discovered. Japan has a unique cool-water fauna with many cones, as well as many Indo-Pacific species in the south.



Marble Cone (4") 10 cm
Conus marmoreus L., 1758. Indo-Pacific. On sand, shallow water; common. Typical form illus. Rarely all-white.



Vidua Cone (3") 7 cm
Conus marmoreus L., 1758, form *vidua* Reeve, 1843, has pattern in two broad bands. Alias *bandanus* of authors.



Conus marmoreus L., 1758. The form *nigrescens* Sowerby, 1859, is usually under 7.5 cm (3") and black in color. Samoa to New Caledonia.



Conus marmoreus L., 1758. This is the white form *suffusa* Sowerby (holotype illus.), restricted to New Caledonia; moderately common.



Imperial Cone (3") 7.5 cm
Conus imperialis L., 1758. Indo-Pacific. On intertidal reefs; common.



Western Imperial Cone (3") 7.5 cm
Conus imperialis subspecies *fuscata* Born, 1778. East Africa. Common. Syn.: *viridula* Lam.



Nicobar Cone (2.5") 6.5 cm
Conus araneosus nicobaricus Hwass, 1792. N.E. Indian Ocean to Philippines. Shallow water; common.



Zoned Cone (2.5") 6.5 cm
Conus zonatus Hwass, 1792. Seychelles to India and Sumatra. Shallow reefs; uncommon. Syn.: *edwardi* Preston.



Textile Cone (3") 7.5 cm
Conus textile L., 1758. Indo-Pacific. Shallow water; common.



Queen Victoria Cone (2") 5 cm
Conus victoriae Reeve, 1843. Northern Territory and Western Australia. Shallow water; moderately common.



Ambassador Cone (1.2") 3 cm
Conus legatus Lamarck, 1810.
Pacific (not Hawaii). Shallow
water; uncommon. *C. canoni-*
cus lacks pink background.



Philippine Cone (2") 5 cm
Conus telatus Reeve, 1848.
Southern Philippines. Moder-
ately deep water; moderately
common.



Paulucci's Cone (2.2") 5.5 cm
Conus paulucciae Sowerby,
1877. Southern Indian Ocean.
Offshore; moderately rare.
May be a form of *C. aureus*.



Abbas Cone (2.4") 6 cm
Conus abbas Hwass, 1792.
Indo-Pacific. On reefs; uncom-
mon. Syn.: *corbula* Sowerby;
euetrios Sowerby.



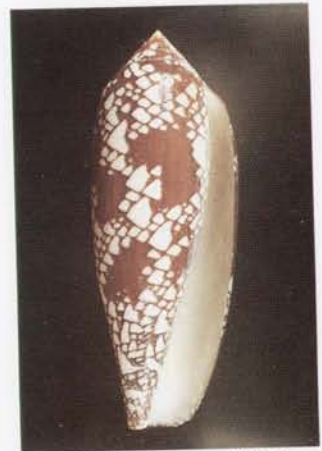
Feathered Cone (2") 5 cm
Conus pennaceus Born, 1778.
Indo-Pacific. Offshore to mod-
erate depths; common. Varies
considerably in shape.



Conus pennaceus Born, 1778.
One of many names given to
this cone is *praelatus* Hwass. It
represents an uncommon form
of the species.



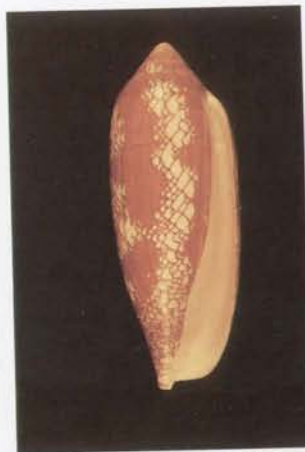
Tiger Cone (2") 5 cm
Conus canonicus Hwass, 1792.
Indo-Pacific. Under rocks on
reefs; moderately common.
Syn.: *tigrinus* Sowerby.



Princely Cone (4") 10 cm
Conus aulicus L., 1758. Indo-
Pacific. On intertidal reefs; un-
common. Lacks vertical black
lines of *C. textile*.



Conus pennaceus Born, 1778.
The name *episcopus* Hwass has
been applied to shells with a
broad body whorl and narrowly
angled shoulder.



Gilded Cone (3.2") 8 cm
Conus auratus Hwass, 1792. So-
ciety Islands and Tuamotu Is-
lands. On intertidal reefs; rare.
May be a form of *C. aulicus*.



Dignified Cone (2.4") 6 cm
Conus magnificus Reeve, 1843.
Indo-Pacific. Shallow water;
common. Long known to col-
lectors (erroneously) as *C. epis-*
copus.



Aureus Cone (2") 5 cm
Conus aureus Hwass, 1792.
Indo-W. Pacific. Under rocks,
on reefs; rare. *C. textile* is more
ventricose.



Gold-leaf Cone (1.5") 3.5 cm
Conus auricomus Hwass, 1792.
Indo-Pacific. On intertidal
reefs; uncommon. Syn.: *dacty-*
losus Kiener.



Netted Cone (2") 5 cm
Conus retifer Menke, 1829.
Indo-Pacific. Shallow water;
uncommon. Syn.: *sulcata* Sow-
erby; *solidus* Sowerby.



Natal Cone (1.5") 4 cm
Conus natalis Sowerby, 1857.
South Africa. Offshore; com-
mon (as a beached shell). Syn.:
gilchristi Sowerby.



Glory-of-the-Sea (4") 10 cm
Conus gloriamaris Chemnitz,
1777. Western Pacific. Shallow
and deep water; moderately
rare.



Bengal Cone (3.5") 9 cm
Conus bengalensis (Okutani,
1968). Bay of Bengal. Moder-
ately deep water; moderately
rare.



Glory-of-India (5") 12.5 cm
Conus milneedwardsi Jous-
seaume, 1894. Indian Ocean;
China Sea. Offshore; rather
rare. Syn.: *clytospira*
M. & S.



Vice Admiral Cone (1.5") 4 cm
Conus locumtenens Blumen-
bach, 1791. Red Sea; N.W. In-
dian Ocean. Common. Syn.:
acuminatus Hwass.



Saffron Cone (3") 7.5 cm
Conus colubrinus Lamarck,
1810. Western Pacific; Samoa;
Sri Lanka. Moderately deep wa-
ter; rare. Alias *C. crocatus* Lam.



Crocatus Cone (3") 7.5 cm
Conus colubrinus form *crocatus*
Lamarck, 1810. S.W. Pacific.
5 to 20 m; uncommon in Solo-
mons.



Thailand Cone (3") 7.5 cm
Conus colubrinus form *thailan-*
dis da Motta, 1978. Andaman
Sea; Thailand. 10-30 m; locally
common.



Admiral Cone (2.5") 6 cm
Conus ammiralis L., 1758. Indo-
W. Pacific. In sand or coral; un-
common. Amount of white
background varies.



Admiral Cone (2.5") 6 cm
Conus ammiralis L., 1758. The
coronate, granulate form at
left is Indian Ocean subspecies
archithalassus Hwass.



Keatlike Cone (1") 2.5 cm
Conus keatiformis Shikama & Oishi, 1977. S.E. Asia. Offshore; rare.



Amadis Cone (2.5") 6.5 cm
Conus amadis Gmelin, 1791. Indian Ocean; Indonesia. Offshore; moderately common. Syn.: *C. lozeti* Richard (freak).



Noble Cone (2") 5 cm
Conus nobilis nobilis L., 1758. Eastern Indian Ocean; Indonesia. Offshore; moderately rare. Syn.: *cordigera* Sowerby.



Victor Cone (2") 5 cm
Conus nobilis subspecies *victor* Broderip, 1842. Islands of Bali-Flores Strait area. Offshore; rare.



Marquesas Cone (1.5") 4 cm
Conus nobilis subspecies *mar-chionatus* Hinds, 1843. Marquesas Islands. Offshore; uncommon.



Geography Cone (4") 10 cm
Conus geographus L., 1758. Indo-Pacific. Shallow water; common. Like *C. tulipa* but has less convex sides.



Tulip Cone (2.5") 6 cm
Conus tulipa L., 1758. Indo-Pacific. Shallow water; common. Has killed humans with its venom.



Fragile Geography Cone 3 cm
Conus geographus subspecies *fragillissimus* Petuch, 1979. Ethiopia; Red Sea. 1 to 3 m; uncommon. Holotype illus.



Obscure Cone (1.2") 3 cm
Conus obscurus Sowerby, 1833. Indo-Pacific. Offshore; moderately common. Lacks coronations of *C. geographus*.



Rhododendron Cone (2") 5 cm
Conus adamsonii Broderip, 1836. Central and S.W. Pacific. Subtidal; rare. Syn.: *rhododendron* Jay.



Rhododendron Cone (2") 5 cm
Conus adamsonii Broderip, 1836. Live-collected specimens have yellow aperture. Not uncommon in Phoenix Is.



Mascarene Cone (2") 5 cm
Conus julii Lienard, 1870. Mauritius and Reunion Island. Moderately deep water; rare. Varies little.



Ruddy Cone (2.5") 6 cm
Conus rubiginosus Hwass, 1792. Indonesia; Philippines. Shallow water; rare.



Circumcision Cone (2.5") 6 cm
Conus circumcisis Born, 1778. Western Pacific. Offshore to moderate depths; uncommon. Syn.: *brazieri* Sowerby.



Aurisiacus Cone (2") 5 cm
Conus aurisiacus L., 1758. Indonesia; Australia. Offshore; rare. Pink color suggests fading.



Sazanka's Cone (1.2") 3 cm
Conus sazanka Shikama, 1970. Western Pacific. Offshore; uncommon. Syn.: *kurzi* Petuch.



Terebra Cone (2.5") 6 cm
Conus terebra Born, 1778. Indo-Pacific. Under rocks on intertidal reefs; moderately common. Syn.: *thomasi* Sby.



Miterlike Cone (1") 2.5 cm
Conus mitratus Hwass, 1792. Indo-Pacific. Intertidal and offshore; uncommon. Apex often eroded.



Cylindrical Cone (1.4") 3.5 cm
Conus cylindraceus Broderip & Sowerby, 1830. Indo-Pacific. Offshore; uncommon. Always very glossy.



Acorn Cone (1.2") 3 cm
Conus glans Hwass, 1792. Indo-Pacific. Shallow water; moderately common. May be confused with *C. tenuistriatus*.



Leaden Cone (1.2") 3 cm
Conus scabriusculus Dillwyn, 1817. Western Pacific. Shallow water; common. Syn.: *fabula* Sowerby; *plumbeus* Reeve.



Scarlet Cone (1.5") 4 cm
Conus coccineus Gmelin, 1791. South Pacific. Shallow water; moderately common. Syn.: *solandri* Broderip & Sowerby.



Thin-line Cone (1.4") 3.5 cm
Conus tenuistriatus Sowerby, 1857. Indo-Pacific. Shallow water; common. Sometimes purplish. Apex bright pink.



Tender Cone (1.5") 4 cm
Conus artoptus Sowerby, 1833. Australia to Philippines. In sand offshore; uncommon. Wrongly known as *tenellus*.



Lettered Cone (4") 10 cm
Conus litteratus L., 1758. Indo-Pacific. Intertidal and subtidal; common. Very thick and heavy. Base pointed, stained purplish.



Leopard Cone (5.5") 14 cm
Conus leopardus (Röding, 1798). Indo-Pacific. Shallow water; common. Heaviest of all cones. Base blunt, white.



Ivory Cone (2") 5 cm
Conus eburneus Hwass, 1792. Indo-Pacific. On sand and reefs; common. Very variable in pattern and shape.



Polyglot Cone (2") 5 cm
C. eburneus Hwass, 1792. Among several attractive varieties is *polyglotta* Weinkauff, 1874, commonly found in the Philippines.



Jickeli's Cone (1.4") 3.5 cm
Conus jickelii Weinkauff, 1873. Western Indian Ocean. Deep water; rare. A lightweight shell.



Tessellate Cone (1.8") 4.5 cm
Conus tessellatus Born, 1778. Indo-Pacific. Shallow water; common. *C. tessellatus* is misspelling.



Violet-base Cone (1.5") 4 cm
Conus suturatus suturatus Reeve, 1844. Eastern Indian Ocean; western Pacific. Offshore; moderately common.



Hawaiian Cone (0.8") 2 cm
Conus suturatus sandwichensis Walls, 1978. Hawaiian Islands (endemic). Offshore; uncommon. Holotype illustrated.



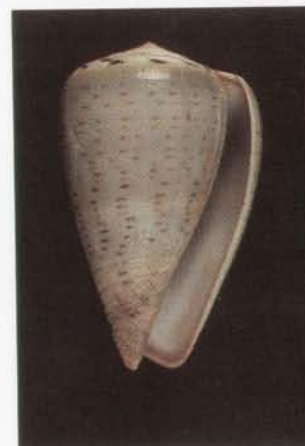
Violet-base Cone * (1.5") 4 cm
Conus suturatus suturatus Reeve, 1844. Eastern Indian Ocean; western Pacific. Offshore; moderately common.



Sharp-angled Cone (1") 2.5 cm
Conus acutangulus Lamarck, 1810. Indo-Pacific. Offshore; uncommon.



Oak Cone (3") 7.5 cm
Conus quercinus Lightfoot, 1786. Indo-Pacific. Offshore; common. This heavy shell varies little.



Glaucous Cone (2") 5 cm
Conus glaucus L., 1758. Western Pacific. Offshore; uncommon. Syn.: *fraxinus* Röding.



Beech Cone (4") 10 cm
Conus betulinus L., 1758. Indo-Pacific. Shallow water; common. Spots vary in shape and size.



Fig Cone (3") 7.5 cm
Conus figulinus L., 1758. Indo-Pacific. Shallow water; common. Syn.: *loroisii* Kiener.



Suratan Cone (4") 10 cm
Conus suratensis Hwass, 1792. Indian Ocean and S.W. Pacific. Uncommon. Syn.: *agrestis* Mörch.



Flag Cone (3.2") 8 cm
Conus vexillum Gmelin, 1791. Indo-Pacific. Offshore; common. Syn.: *sumatrensis* Hwass; *robillardi* Bernardi.



Namocanus Cone (3") 7.5 cm
Conus namocanus Hwass, 1792. Indian Ocean. Shallow water; common. May have spiral stripes. Syn.: *badius* Kiener.



Weasel Cone (2.5") 6 cm
Conus mustelinus Hwass, 1792. Indo-W. Pacific. Shallow water; uncommon. May be confused with *C. capitaneus*.



Captain Cone (2.5") 6 cm
Conus capitaneus L., 1758. Indo-Pacific. Intertidal; common. Syn.: *classarius* Hwass; *ceciliae* Crosse.



Little Captain Cone (1.2") 3 cm
Conus capitanellus Fulton, 1938. Southern Japan; Taiwan. Deep water; moderately rare.



Trigonal Cone (2") 5 cm
Conus trigonus Reeve, 1848. Northern and western Australia. Intertidal mud flats; uncommon. Not *badius* Kiener.



Reference Cone (1.5") 3.7 cm
Conus advertex Garrard, 1961. Off southern Queensland and New South Wales. Moderately deep water; uncommon.



Voluminous Cone (1.5") 4 cm
Conus voluminalis Reeve, 1843. Eastern Indian Ocean; western Pacific. Deep water; uncommon. Syn.: *macarae* Bernardi.



General Cone (2.5") 6.5 cm
Conus generalis generalis L., 1767. Pacific. Intertidal; common. Very variable.



Maldive Cone (2.5") 6.5 cm
Conus generalis subspecies
maldivus Hwass, 1792. Indian
Ocean. Common.



Bough Cone (3") 7.5 cm
Conus thalassiarachus Sowerby,
1834. S. Philippines. Intertidal
to 2 m; common. Spire height
varies.



Necklace Cone (2.2") 5.5 cm
Conus monile Hwass, 1792.
Eastern Indian Ocean. Moder-
ately deep water; uncommon.
Syn.: *anadema* Tomlin.



Engraved Cone (2") 5 cm
Conus inscriptus Reeve, 1843.
Indian Ocean. Offshore; com-
mon. Syn.: *keati* Sowerby;
planiliratus Sowerby.



Kimio's Cone (0.8") 2 cm
Conus kimioi (Habe, 1965). Ja-
pan; Taiwan; Philippines. Deep
water; rare.



Scullett's Cone (1.8") 4.5 cm
Conus sculletti Marsh, 1962.
Southern Queensland and
northern New South Wales.
Deep water; uncommon.



Eugrammus Cone (1.2") 3 cm
Conus eugrammus Bartsch &
Rehder, 1943. S.W. Pacific; Ha-
waii. Offshore; rare. Syn.: *wa-
kayamaensis* Kuroda.



Otohime's Cone (1.2") 3 cm
Conus otohimeae Kuroda &
Ito, 1961. Southern Japan to
Philippines. Deep water; rare.
Syn.: *aphrodite* Petuch, 1979.



Siebold's Cone (3") 7.5 cm
Conus sieboldii Reeve, 1848. Ja-
pan; Taiwan. Deep water; com-
mon. Syn.: *rarimaculata* Sow-
erby.



Ione Cone (2.2") 5.5 cm
Conus ione Fulton, 1938.
Southern Japan. Deep water;
uncommon. *C. sieboldii* similar
but lacks violet color.



Teramachi's Cone (3") 7.5 cm
Conus teramachii (Kuroda,
1956). S. Japan to South Africa.
Deep water; moderately rare.
Syn.: *torquatus* von Martens.



Hirase's Cone (2") 5 cm
Conus hirasei (Kira, 1956).
Southern Japan to Taiwan.
Deep water; rare.



Austral Cone (2.5") 6 cm
Conus australis Holten, 1802.
Southern Japan; China Sea.
Dredged, about 40 m; com-
mon. Syn.: *alabasteroides* Shi-
kama.



Duplicate Cone (2.5") 6.5 cm
Conus duplicatus Sowerby,
1823. Southern Japan; Taiwan;
Solomons. Deep water; rare.



Kurohara's Cone (2.5") 6.5 cm
Conus duplicatus Sowerby,
1823. Described recently as *ar-
madillo* Shikama (extreme vari-
ant) and *kuroharai* Habe (illus.).



Ichinose Cone (2.5") 6 cm
Conus ichinoseana (Kuroda,
1956). Southern Japan to Tai-
wan; Philippines. Deep water;
uncommon. Syn.: *prioris*
Kuroda.



Granger's Cone (2") 5 cm
Conus grangeri Sowerby, 1900.
Taiwan; Philippines. Deep wa-
ter; uncommon. *C. sulcatus*
similar but sides straighter.



Flat-ridge Cone (1.5") 4 cm
Conus eucoronatus Sowerby,
1903. Natal, South Africa;
southern Mozambique. Deep
water; rare.



Pagoda Cone (1.5") 4 cm
Conus pagodus Kiener, 1846.
Japan; Taiwan; Philippines.
Deep water; common. For-
merly *cancellatus* Hwass.



Orbigny's Cone (2.2") 5.5 cm
Conus orbignyana Audouin, 1831.
Indo-Pacific. In deep water; lo-
cally common. Syn.: *planicos-
tatus* Sowerby.



Comatose Cone (1.8") 4.5 cm
Conus comatosa Pilsbry, 1904.
Southern Japan to Taiwan;
moderately rare. Sculptured
form. Syn.: *dormitor* Pilsbry.



Hypo Cone (1.2") 3 cm
Conus hypochlorus Tomlin,
1937. Central Philippines. Deep
water; uncommon. Syn.: *cro-
ceus* E. A. Smith (not Sowerby).



Wickerwork Cone (1.5") 4 cm
Conus vimineus Reeve, 1849.
Philippines. Moderately deep
water; moderately common.
Light and fragile shell.



Spindle Cone (1.4") 3.5 cm
Conus aculeiformis Reeve,
1844. Indo-Pacific. Offshore, to
300 m; uncommon. Syn.:
longurionis Kiener.



St. Thomas Cone (3") 7.5 cm
Conus thomae Gmelin, 1791. Indonesia. Offshore; formerly rare. Syn.: *omaicus* Hwass; *jousseamei* Couturier.



Virgin Cone (3") 7.5 cm
Conus virgo L., 1758. Indo-Pacific. Shallow water; common. Large purple blotch at base.



False Virgin Cone (1.5") 4 cm
Conus emacius Reeve, 1849. Indo-Pacific. Shallow water; common. Sculpture of fine spiral threads.



Celine's Cone (4") 10 cm
Conus coelinae Crosse, 1858. Hawaii to New Caledonia; Philippines. Offshore; rare. Holotype illus.



Conus coelinae Crosse, 1858. Very similar to *C. virgo* but more slender and lacks purple or violet base. This specimen without periostracum.



Conus coelinae Crosse, 1858. Shells from Midway and Hawaiian Islands are form *spiceri* Rehder & Bartsch (paratype).



Conus coelinae Crosse, 1858. An elongated, brighter colored form, described as *berdulinus* Veillard, 1972. Syn.: "kintoki."



Kashiwajima Cone (2.5") 6 cm
Conus kashiwajimensis Shikama, 1971. S. Japan to Taiwan; Sri Lanka. Deep water; rare. Probably is *coelinae*.



Augur Cone (2.5") 6 cm
Conus augur Lightfoot, 1786. Indian Ocean; S.W. Pacific. Shallow reef areas; moderately common.



Tribble's Cone (3.4") 8.5 cm
Conus tribblei Walls, 1977. Taiwan; Philippines; Solomons. Deep water; moderately common. Holotype illustrated.



Conus tribblei Walls, 1977. Distinguishable from *C. reclusianus* by its lack of undulate shoulders. Named after a pet cat.



Bayan's Cone (2.5") 6 cm
Conus bayani Jousseaume, 1872. Indian Ocean. Moderately deep water; uncommon.



Urashima Cone (2.5") 6 cm
Conus urashimanus Kuroda & Ito, 1961. Southern Japan; Philippines. Deep water; moderately common.



Récluz's Cone (2.5") 6.5 cm
Conus recluzianus Bernardi, 1853. S.W. Pacific. Deep water; moderately common. Syn.: *gloriakiensis* K. & I.



Nielsen's Cone (2") 5 cm
Conus nielsenae Marsh, 1962. Northern Australia; Kermadec Islands. Offshore; moderately uncommon.



Nielsen's Cone (1.2") 3 cm
Conus nielsenae Marsh, 1962. Western Australia. Locally common. Form *reductaspiralis* Walls, 1979 (holotype illus.).



Nada Cone (1") 2.5 cm
Conus nadaensis (Azuma & Toki, 1970). Off Nada, Wakayama, Japan. Uncommon.



Calf Cone (2") 5 cm
Conus vitulinus Hwass, 1792. Indo-Pacific. On reefs, under coral; common. Syn.: *praeclearus* Fenoux.



Kermadec Cone (1.8") 4.5 cm
Conus kermadecensis Iredale, 1913. China Sea; Australia to E. Africa. Moderate depths; uncommon.



Striatellus Cone (1.8") 4.5 cm
Conus striatellus Link, 1807. Indo-Pacific. Shallow water; moderately common. Syn.: *pulchrelineatus* Hopwood.



Comma Cone (1.8") 4.5 cm
Conus connectens A. Adams, 1855. Western Pacific. Subtidal; moderately rare. Syn.: *pulchellus* Swainson.



Singed Cone (2.8") 7 cm
Conus consors Sowerby, 1833. Indo-Pacific. Offshore; uncommon. Syn.: *anceps* A. Adams; *dalliei* Crosse.



Magus Cone (2.5") 6 cm
Conus magus L., 1758. Indo-Pacific. Shallow water; common. Syn.: *carinatus* Swainson.



Conus magus L., 1758. One of the most variable of all cones with a seemingly endless range of color patterns.



Multilinear Cone (1.2") 3 cm
Conus polygrammus Tomlin, 1937. Western Pacific. Uncommon. Syn.: *multilineatus* Sowerby (holotype illus.).



Bubble Cone (2.5") 6 cm
Conus bullatus L., 1758. Indo-Pacific. Offshore; uncommon. Syn.: *pongo* Shikama & Oishi, 1977.



Bubble Cone (2.5") 6 cm
Conus bullatus L., 1758. Variety *articulata* Dautzenberg is much appreciated by collectors.



Palisade Cone (4") 10 cm
Conus cervus Lamarck, 1822. Philippines. Offshore; rare. Recently rediscovered. A classic rarity among cones.



Vic Wee's Cone (3") 7.5 cm
Conus vicweei Old, 1973. Sumatra to Thailand. Deep water; moderately rare. Paratypes illus.



Du Savel's Cone (2") 5 cm
Conus dusaveli (H. Adams, 1872). Ryukyu Islands; Philippines. Deep water; moderately rare.



Clouded Cone (2") 5 cm
Conus floccatus Sowerby, 1839. Pacific. Offshore reefs in deep water; moderately rare.



Floridus Cone (2.5") 6 cm
Conus floridus Sowerby, 1858. N.E. Indian Ocean; W. Thailand. Offshore; uncommon. Syn.: *chusaki* da Motta.



Governor Cone (2.5") 6 cm
Conus gubernator Hwass, 1792. Indian Ocean. Shallow water; common.



Barthelémy's Cone (2.5") 6 cm
Conus barthelemyi Bernardi, 1861. Indian Ocean. Offshore; moderately rare. Syn.: *gaugini* Richard & Salvat.



Prampart's Cone (2.5") 6 cm
Conus barthelemyi form *leehmani* da Motta & Rockel, 1979. Uncommon. Indian Ocean.



Striate Cone (4") 10 cm
Conus striatus L., 1758. Indo-Pacific. Shallow water; common. *C. terminus* similar but lacks hairlines.



Planorbis Cone (1.8") 4.5 cm
Conus planorbis Born, 1778. Indo-Pacific. Offshore; common. Syn.: *chenui* Crosse.



Dark Cone (1.8") 4.5 cm
Conus furvus Reeve, 1843. S.W. Pacific. Offshore to moderate depths; common. Numerous synonyms.



Black-spot Cone (1.2") 3 cm
Conus nigropunctatus Sowerby, 1857. Indo-Pacific. Shallow water; moderately common.



Monastic Cone (2") 5 cm
Conus monachus L., 1758. Indo-Pacific. Shallow water; common. Syn.: *achatinus* Gmelin; *vinctus* A. Adams.



Parian Cone (1.2") 3 cm
Conus parius Reeve, 1844. Philippines to New Hebrides. On reefs, under coral; common.



Rayed Cone (2.5") 6 cm
Conus radiatus Gmelin, 1791. Fiji to Philippines. Moderate depths; common. Spiral ridges on spire whorls.



Prefect Cone (2") 5 cm
Conus ochroleucus Gmelin, 1791. Philippines; New Guinea. Moderately deep water; common. Syn.: *praefectus* Hwass.



Pilkey's Cone (2.5") 6 cm
Conus pilkeyi Petuch, 1974. Fiji to Philippines. Offshore; uncommon. Close to *C. ochroleucus* but spire lower.



Janus Cone (2.5") 6 cm
Conus janus Hwass, 1792. East coast of central Africa and the Mascarene Islands. Offshore; uncommon.



Specter Cone (1.5") 4 cm
Conus spectrum L., 1758. Western Pacific. Offshore; moderately common.



Stillate Cone (1.5") 4 cm
Conus spectrum form *stillatus* Reeve, 1849, comes from Australia. Common.



Sprinkled Cone (1.4") 3.5 cm
Conus conspersus Reeve, 1844. Philippines; Indonesia. Moderately deep water; uncommon. (Form *daphne* Boivin, 1864.)



Wittig's Cone (1.4") 3.5 cm
Conus wittigi Walls, 1977.
Sunda Island (Indonesia). Shal-
low water; rare. Has tented pat-
tern of a "textile" cone.



Lienard's Cone (1.5") 3.5 cm
Conus lienardi Bernardi &
Crosse, 1861. Melanesia (New
Caledonia). Locally common.
Variable patterns.



Lienard's Cone (1.4") 3.5 cm
Conus lienardi Bernardi &
Crosse, 1861. Melanesia (New
Caledonia). Shallow water; un-
common. Close to *C. cinereus*.



Lynceus Cone (2.5") 6.5 cm
Conus lynceus Sowerby, 1857.
Indo-Pacific. Offshore; moder-
ately uncommon. Aperture
pink.



Sunburnt Cone (2") 5 cm
Conus cinereus Hwass, 1792.
Western Pacific; Indonesia.
Offshore; common. Form
gubba Kiener is almost black.



Thunderbolt Cone (2") 5 cm
Conus fulmen Reeve, 1843.
Southern Japan to Ryukyus.
Deep water; locally common.
Syn.: *kirai* Kuroda.



Lithograph Cone (2") 5 cm
Conus lithoglyphus Hwass, 1792.
Indo-Pacific. Shallow water;
common. *C. lithoglyphus* is
misspelling.



Pertusus Cone (1.2") 3 cm
Conus pertusus Hwass, 1792.
Indo-Pacific. Offshore to mod-
erate depths; uncommon.



Back-end Cone (1") 2.5 cm
Conus aplustre Reeve, 1843.
Australia. Intertidal; common.
Syn.: *lugubris* Reeve.



Back-end Cone (1") 2.5 cm
Conus aplustre Reeve, 1843. A
young specimen showing spe-
cial color patterns.



Angas's Cone (1.4") 3.5 cm
Conus angasi Tryon, 1883. E.
Australia. Moderately deep wa-
ter; uncommon. Syn.: *metcal-
fei* Angas.



Papilla Cone (1.4") 3.5 cm
Conus papilliferus Sowerby,
1834. Eastern Australia. Shallow
water; common.



Anemone Cone (2") 5 cm
Conus anemone Lamarck, 1810. Southern Australia. Off-shore; common.



Anemone Cone (2") 5 cm
Conus anemone Lamarck, 1810. One of numerous forms, this has been called *peronianus* Iredale.



Hyena Cone (2") 5 cm
Conus hyaena Hwass, 1792. India, Bay of Bengal. Tide pools and offshore; common. Syn.: *mutabilis* Reeve.



Cuming's Cone (1") 2.5 cm
Conus cumingii Reeve, 1848. Philippines to Solomons and Queensland. Moderate to shallow water; uncommon.



Cabrit's Cone (1") 2.5 cm
Conus cabritii Bernardi, 1858. New Caledonia (endemic). Shallow water; uncommon. Syn.: *vayssesianus* Crosse.



Admirable Cone (1.5") 4 cm
Conus praecellens A. Adams, 1854. Western Pacific. Deep water; moderately common. Syn.: *sowerbyi* Sowerby.



Rat Cone (1.8") 4.5 cm
Conus rattus Hwass, 1792. Indo-Pacific. Shallow water; common. Syn.: *taitensis* Hwass; *viridis* Sowerby.



Smoky Cone (1") 2.5 cm
Conus fumigatus Hwass, 1792. Red Sea area. Shallow water; moderately common. Syn.: *pazii* Bernardi; *adustus* Sowerby.



Klem's Cone (2") 5 cm
Conus klemae (Cotton, 1953). Southern Australia. Offshore to moderate depths; uncommon. Syn.: *coralinus* Habe & Kosuge.



Cat Cone (1.5") 4 cm
Conus catus Hwass, 1792. Indo-Pacific. Intertidal, on reefs; common. Syn.: *discrepans* Sowerby; *purus* Pease.



Soldier Cone (3") 7.5 cm
Conus miles L., 1758. Indo-Pacific. Offshore to moderate depths; common. Periostracum thick.



Characteristic Cone (2") 5 cm
Conus characteristicus G. Fischer, 1807. Indo-W. Pacific. Shallow water; moderately common.



Yellow Pacific Cone (1.5") 4 cm
Conus flavidus Lamarck, 1810.
Indo-Pacific. Shallow water;
common. Lacks coronations on
spire whorls.



Frigid Cone (1.5") 4 cm
Conus frigidus Reeve, 1848. Pa-
cific. Shallow water; locally
common. Has 3 spiral ridges on
each spire whorl.



Livid Cone (2") 5 cm
Conus lividus Hwass, 1792.
Indo-Pacific. Shallow water;
common. Has prominent
rounded coronations.



Bloodstained Cone (1.4") 3.5 cm
Conus sanguinolentus Quoy &
Gaimard, 1834. Indo-Pacific.
Shallow water; common.



Little Cone (1.2") 3 cm
Conus parvulus Link, 1807.
Western Pacific. Shallow water;
moderately common.



Morelet's Cone (1.5") 4 cm
Conus moreleti Crosse, 1858.
Indo-Pacific. On reefs, under
coral; locally common.



Ringed Cone (1.5") 4 cm
Conus balteatus Sowerby,
1833. Indo-Pacific. On interti-
dal reefs; uncommon.



Bilious Cone (1.8") 4.5 cm
Conus biliosus (Röding, 1798).
Indian Ocean. Shallow water;
common. Syn.: *piperatus*
Dillwyn.



Meyer's Bilious Cone
(1.8") 4.5 cm
Conus biliosus subspecies
meyeri Walls, 1979. South Af-
rica. Holotype illus.



Burnt Cone (1.2") 3 cm
Conus encaustus Kiener, 1845.
Marquesas Islands. Shallow
water; common. Thick and
heavy. Syn.: *praetextus* Reeve.



Muricate Cone (1.4") 3.5 cm
Conus muriculatus Sowerby,
1833. S.W. Pacific. Offshore;
uncommon. Smooth and gran-
ulose forms occur.



Coffee Cone (1.8") 4.5 cm
Conus excavatus Sowerby,
1866. Red Sea; western Indian
Ocean. Offshore; common.
Syn.: *coffae* of authors.



Abbreviated Cone (1.6") 4 cm
Conus abbreviatus Reeve, 1843.
Hawaiian Islands (endemic).
Reefs; common.



Ringed Cone (1.4") 3.5 cm
Conus taeniatus Hwass, 1792.
Red Sea; northwestern Indian
Ocean. Offshore; common.



Red Sea Cone (1") 2.5 cm
Conus erythraeensis Reeve,
1843. Red Sea and adjacent ar-
eas. Shallow water; common.
Thick and heavy for its size.



Thousand-spot Cone (1") 2.5 cm
Conus miliaris Hwass, 1792.
Indo-Pacific. Shallow water;
common. Syn.: *barbadensis*
Hwass.



Crowned Cone (1.2") 3 cm
Conus coronatus Gmelin, 1791.
Indo-Pacific. Intertidal reefs;
common.



Lightning Cone (1") 2.5 cm
Conus fulgetrum Sowerby,
1834. Indo-Pacific. Shallow wa-
ter; moderately common.
Syn.: *scaber* Kiener.



Obese Cone (1.8") 4.5 cm
Conus zeylanicus Gmelin,
1791. Indian Ocean. Shallow
water; moderately uncommon.
Note hairlines in the pattern.



Fly-specked Cone (2") 5 cm
Conus stercusmuscarum L.,
1758. Western Pacific. Shallow
water; common. Spots may
fuse into blotches.



Sand-dusted Cone (1.5") 4 cm
Conus arenatus Hwass, 1792.
Indo-Pacific. Shallow water;
common. Granulose speci-
mens are known.



Flea-bite Cone (2.5") 6 cm
Conus pulicarius Hwass, 1792.
Indo-Pacific. Intertidal, in
sand; common.



Hebrew Cone (1.5") 4 cm
Conus ebraeus L., 1758. Indo-
Pacific (including coast of Cen-
tral America). Shallow water;
common. Rarely pinkish.



Vermiculate Cone (1.2") 3 cm
Conus chaldeus (Röding, 1798).
Indo-Pacific (including coast of
Central America). In sand, shal-
low water; common.



Stupella Cone (2.8") 7 cm
Conus stupella (Kuroda, 1956).
Southern Japan and Taiwan.
Deep water; moderately rare.
Fresh shells violet.



Grand Cone (5") 12.5 cm
Conus pergrandis (Iredale, 1937). Western Pacific. Deep water; rare. Syn.: *fletcheri* Petch & Mendenhall.



Smirna Cone (3") 7.5 cm
Conus smirna Bartsch & Rehder, 1943. Southern Japan; Hawaii. Deep water; rare. Syn.: *profundorum* Kuroda.



Glossy Cone (1") 2.5 cm
Conus clarus E. A. Smith, 1881. Southern and Western Australia. Offshore; uncommon. Syn.: *segravei* Gatliff.



Marriage Cone (1") 2.5 cm
Conus sponsalis sponsalis Hwass, 1792. Indo-Pacific. Shallow water; common. Syn.: *nanus* Sowerby.



Music Cone (0.8") 2 cm
Conus musicus Hwass, 1792. Indo-W. Pacific. Shallow water; locally common. *C. sponsalis* more convex.



South African Music Cone 2 cm
Conus musicus subspecies *parvatus* Walls, 1979. South Africa. Reef beaches; common. Holotype illus.



Molucca Cone (1.5") 4 cm
Conus moluccensis Küster, 1838. Western Pacific. Offshore; rare. Outer lip concave. Syn.: *stainforthii* Reeve.



Proximus Cone (1.4") 3.5 cm
Conus proximus Sowerby, 1859. Western Pacific. Moderately deep water; moderately rare. Outer lip straight.



Proximus Cone (1.4") 3.5 cm
Conus proximus Sowerby, 1859. A New Guinea color form without large blotches. Uncommon.



Mariel's Cone (1.4") 3.5 cm
Conus marielae Rehder & Wilson, 1975. Marquesas Islands. Moderately deep water; rare. Holotype illustrated.



Stormy Cone (1.8") 4.5 cm
Conus nimbosus Hwass, 1792. Indo-W. Pacific. Moderately deep water; uncommon. Spire whorls have strong spiral.



Red-stained Cone (1.5") 4 cm
Conus rufimaculosus Macpherson, 1959. East Australia. Deep water; moderately common.



Cocceus Cone (1.5") 4 cm
Conus cocceus Reeve, 1844. Western Australia. Shallow water; locally common. Syn.: *kieneri* Crosse.



Memi's Cone (1.2") 3 cm
Conus memiae (Habe & Kosuge, 1960). Western Pacific. Deep water; rare. Syn.: *adonis* Shikama.



Violet-mouth Cone (1.4") 3.5 cm
Conus iodostoma Reeve, 1843. Western Indian Ocean. Off-shore; uncommon.



Timor Cone (1.5") 4 cm
Conus timorensis Hwass, 1792. Mauritius to New Guinea. Moderately deep water; rare. Syn.: *traversianus* Smith.



Nisus Cone (2") 5 cm
Conus stramineus Lamarck, 1810. Indo-W. Pacific. Off-shore; common. Syn.: *alveolus* Sowerby; *nisus* Kiener.



Minnamurra Cone (1") 2.5 cm
Conus minnamurra (Garrard, 1961). S.E. Australia. Deep water; uncommon.



Wallangra Cone (1.4") 3.5 cm
Conus wallangra (Garrard, 1961). Southern Queensland; northern New South Wales. Deep water; uncommon.



Brown-flame Cone (1.2") 3 cm
Conus lentiginosus Reeve, 1844. Northern Indian Ocean. Shallow water; moderately common.



Clay Cone (2") 5 cm
Conus argillaceus Perry, 1811. N.W. Indian Ocean. Coral reefs; uncommon. Syn.: *splendidulus* Sowerby.



Luteus Cone (1.2") 3 cm
Conus luteus Sowerby, 1833. Indo-Pacific. Dredged or beach; moderately rare. Usually rather worn.



Neptune Cone (1.5") 4 cm
Conus neptunus Reeve, 1843. S.W. Pacific. Deep water; rare. Pattern constant. Syn.: *neptunoides* E. A. Smith.



Sulcate Cone (2.8") 7 cm
Conus sulcatus Hwass, 1792. Japan; Taiwan; Bay of Bengal to Solomons. Offshore; common. Syn.: *bocki* Sowerby.



Deep-grooved Cone (1.5") 4 cm
Conus mucronatus Reeve, 1843. China Sea; Philippines. Offshore; common. Syn.: *alabaster* Reeve.



Siboga Cone (1.4") 3.5 cm
Conus sibogae Schepman, 1913. Indonesia to Queensland. Moderately deep water; uncommon. Holotype illus.



Thin-line Cone (1.1") 2.7 cm
Conus filicinctus Schepman, 1913. Java. Deep water; rare. Holotype illustrated.



Distant Cone (3.5") 9 cm
Conus distans Hwass, 1792. Indo-Pacific. Shallow reefs; common. Syn.: *waterhousei* Brazier.



Stigmatic Cone (1.5") 4 cm
Conus stigmaticus A. Adams, 1853. S.W. Pacific. Reefs; uncommon. May be form of *cine-reus*.



Ribbon Cone (1.4") 3.5 cm
Conus lemniscatus Reeve, 1849. Northern Indian Ocean. Offshore; uncommon. Syn.: *sagittatus* Sowerby.



Varius Cone (1.5") 4 cm
Conus varius L., 1758. East Africa to Fiji. Shallow sands; common. Syn.: *hevassii* A. Adams.



Axelrod's Cone (0.6") 1.6 cm
Conus axelrodi Walls, 1978. Taiwan to New Guinea. Offshore; moderately common. Holotype illustrated.



Boeticus Cone (1.2") 3 cm
Conus boeticus Reeve, 1844. Indo-Pacific. On sand, shallow water; common. Very variable pattern.



Kinoshita's Cone (2.8") 7 cm
Conus kinoshitai (Kuroda, 1956). China Sea; Philippines; Solomons. Moderately deep water; uncommon.



Chiang's Cone (0.8") 2 cm
Conus chiangi (Azuma, 1972). Taiwan; southern Japan. Offshore coral banks; uncommon. Possibly a turrid.



Pöhl's Cone (2.5") 6 cm
Conus poehlianus Sowerby, 1887. S.W. Pacific. Shallow sands; uncommon.



Mauritian Cone (1.2") 3 cm
Conus cernicus H. Adams, 1869. Western Indian Ocean. Offshore; uncommon. Syn.: *propinquus* E. A. Smith.



Nussatella Cone (1.2") 3 cm
Conus nussatella L., 1758. Indo-Pacific. Shallow water; common.



Tendineus Cone (2") 5 cm
Conus violaceus Gmelin, 1791. Indian Ocean. Fairly common on reefs. Syn.: *tendineus* Hwass.



Illustrious Cone (3.4") 8.5 cm
Conus excelsus Sowerby, 1908. Western Pacific. Offshore; rare. Syn.: *tannaensis* Cotton; *nakayasui* Shikama & Habe.



Exceptional Cone (1.5") 4 cm
Conus eximius Reeve, 1849. S.E. Asia; Philippines. Shallow water; uncommon.



Schepman's Cone (1") 2.5 cm
Conus schepmani Fulton, 1936. S.W. Pacific. Deep water; rare. Syn.: *elegans* Schepman not Sowerby.



Typhon Cone (1.5") 4 cm
Conus typhon Kilburn, 1975. Off Natal and Mozambique. Deep water; uncommon.



Cuvier's Cone (1.5") 4 cm
Conus cuvieri Crosse, 1858. Red Sea. Shallow water; uncommon. Very thin and light.



Burnished Cone (0.5") 1.2 cm
Conus rutilus Menke, 1843. Southern half of Australia; Tasmania. Shallow water; moderately common. Usually eroded.



Pontifical Cone (1.2") 3 cm
Conus dorreensis Peron, 1807. Western Australia. Shallow water; common. Syn.: *pontificalis* Lamarck.

MEDITERRANEAN CONES

Only one living cone is found in the Mediterranean, although it is very variable and has received over 80 names. Rarely, sinistral specimens are found. Forms or subspecies of *C. ventricosus* occur in N.W. Africa and the Canary Islands.



Mediterranean Cone (1.5") 4 cm
Conus ventricosus Gmelin, 1791. Mediterranean; West Africa. Shallow water; common. Syn.: *mediterraneus* Hwass.



Mediterranean Cone (1.5") 4 cm
Conus ventricosus Gmelin, 1791. Forms such as *aemulus* Reeve and *hybridus* Kiener are very closely related.

WEST AFRICAN and SOUTH AFRICAN CONES

The West African cones are so variable that their speciation is not clear. Some are variants of the Mediterranean Cone. Others are distinct. South Africa has a mixture of endemics, Indian Ocean and West African species.



Butterfly Cone (4") 10 cm
Conus pulcher Lightfoot, 1786. S.W. Africa. Shallow water; common. Syn.: *prometheus* Hwass; *papilionaceus* Hwass.



Lesser Butterfly Cone (2") 5 cm
Conus byssinus (Röding, 1798). West Africa. Shallow water; moderately common. Has been confused with *C. pulcher*.



Variable Cone (1.2") 3 cm
Conus variegatus Kiener, 1845. Southern West Africa. Shallow water; moderately common. Syn.: *chytreus* Tryon.



Variable Cone (1.2") 3 cm
Conus variegatus Kiener, 1845. There are many banded varieties of this cone, some very striking.



Onion Cone (1.2") 3 cm
Conus bulbosus Reeve, 1843. Southern West Africa. Intertidal and offshore; common. Syn.: *zebroides* Kiener.



Clover's Cone (1") 2.5 cm
Conus soaresi Trovao, 1978. Senegal; West Africa. Shallow water; uncommon. Syn.: *cloveri* Walls, 1978. Type illus.



Clover's Cone (1") 2.5 cm
Conus soaresi Trovao, 1978. Uncommon and slightly variable cone. Given two names within days of each other.



Cape Verde Cone (1.4") 3.5 cm
Conus venulatus Hwass, 1792. Cape Verde Islands. Shallow water; uncommon. Syn.: *nivosus* Lamarck; *trochulus* Reeve.



Cape Verde Cone (1.4") 3.5 cm
Conus venulatus Hwass, 1792. This species also occurs along the West African coast. Shells are often eroded.



Girdled Cone (1.2") 3 cm
Conus balteus Wood, 1828.
Cape Verde Islands (endemic).
Shallow water; uncommon.
Very variable in pattern.



Conus balteus Wood, 1828.
One of the synonyms of this
cone is *cuneolus* Reeve. The
name was based on a dark-col-
ored shell.



Trader Cone (1.2") 3 cm
Conus mercator L., 1758. West
Africa; Cape Verde Islands.
Shallow water; locally com-
mon. Syn.: *lamarckii* Kiener.



Ambiguous Cone (1.5") 4 cm
Conus ambiguus Reeve, 1844.
West Africa. 1 to 30 m; moder-
ately common. Syn.: *gernanti*
Petuch.



Turtle Cone (2") 5 cm
Conus ermineus Born, 1778.
West Africa; West Indies. Off-
shore; moderately common.
Syn.: *ranunculus* Hwass.



Ruddy Cone (1.5") 4 cm
Conus tinianus Hwass, 1792.
South Africa. Shallow water;
common, as beach shells. Per-
fect shells rare.



Tasle's Cone (1.5") 4 cm
Conus taslei Kiener, 1845. S.W.
Africa. Shallow to moderately
deep water; uncommon. Syn.:
desidiosus A. Adams.



Turret Cone (3") 7.5 cm
Conus altispiratus Sowerby,
1873. South Africa. Offshore,
60-700 m; uncommon. Syn.:
turritus Sowerby.



Alga Cone (1.5") 4 cm
Conus algoensis Sowerby,
1834. South Africa. Offshore;
common as a beach shell. On
left is form *simplex* Sowerby.



Jeffreys Bay Cone (1.5") 4 cm
Conus infrenatus Reeve, 1848.
South Africa. Offshore; com-
mon as a beach shell. *C. visa-*
genus Kilburn may be this.



Bairstow's Cone (1.5") 4 cm
Conus bairstowi Sowerby,
1889. Cape Province, South Af-
rica. Beach shells only known;
uncommon.



Guinea Cone (2") 5 cm
Conus guineensis Gmelin,
1791. South Africa. Offshore;
common as a beach shell. Syn.:
informis Hwass.



Hybrid Cone (1.2") 3 cm
Conus aemulus Reeve, 1844, form *hybridus* Kiener, 1845. West Africa. Common. *C. aemulus* has dotted white lines.



Hybrid Cone (1.2") 3 cm
Conus aemulus form *hybridus* Kiener, 1845. West Africa. Variation in pattern.



Garter Cone (2") 5 cm
Conus genuanus L., 1758. West Africa. Shallow water. Fairly common. Syn.: *sphinx* Röding.

FLORIDA and CARIBBEAN CONES

From Bermuda to northern Brazil the Western Atlantic supports fewer than four dozen species of cones. Recent scuba diving has been bringing up new varieties in the West Indies.



Alphabet Cone (2") 5 cm
Conus spurius Gmelin, 1791. S.E. United States and West Indies. Common. Syn.: *proteus* Hwass.



Gold-banded Cone (2.5") 6 cm
Conus spurius form *aureofasciatus* Rehder & Abbott, 1951. A freak color form from the Gulf of Mexico. Rare.



Lorenz's Cone (2.5") 6 cm
Conus spurius subspecies *lorenzianus* Dillwyn, 1817. Many races exist to the south of Florida.



Lorenz's Cone (2.5") 6 cm
This form is from Honduras in deep water. Some forms have large brown blotches.



Lorenz's Cone (2.5") 6 cm
Conus spurius subspecies *lorenzianus* Dillwyn, 1817. This is the typical form found in Colombia and Venezuela.



Sennott's Cone (1.2") 3 cm
Conus sennottorum Rehder & Abbott, 1951. Off Yucatan; rare. Most specimens are more pear-shaped.



Crown Cone (2") 5 cm
Cone regius Gmelin, 1791. Georgia; South Florida; West Indies; Brazil. Moderately deep water; common.



Yellow Crown Cone (2") 5 cm
Conus regius Gmelin, 1791. This striking color form is called *citrinus* Gmelin, 1791.



Sozon's Cone (3") 7.5 cm
Conus delessertii Récluz, 1843.
S.E. United States. Offshore
reefs; uncommon. Syn.: *so-*
zoni Bartsch.



Centurion Cone (2") 5 cm
Conus centurio Born, 1778.
Caribbean. Moderate depths,
or beached; uncommon. Syn.:
woolseyi M. Smith.



Amphiurgus Cone (1.5") 4 cm
Conus amphiurgus Dall, 1889.
S.E. United States; Puerto
Rico; Yucatan. Offshore; un-
common. Holotype illus.



Julia Clench's Cone (1.5") 4 cm
Conus amphiurgus form *juliae*
Clench, 1942. S.E. United
States. 2 to 50 m; uncommon.



Carrot Cone (1.5") 4 cm
Conus daucus Hwass, 1792.
N.E. Brazil and Caribbean. Off-
shore; uncommon. Syn.: *pas-*
tinaca Lamarck.



Jucunda Cone (1.2") 3 cm
Conus jucundus Sowerby,
1887. Caribbean. Like *cardinalis*
but aperture white, not pink.



Abbott's Cone (1.3") 3 cm
Conus abbotti Clench, 1946.
Bahamas. Rare. Holotype illus.



Thin Cone (1") 2.5 cm
Conus attenuatus Reeve, 1844.
Caribbean. Shallow water;
moderately rare. Often more
slender than this specimen.



Florida Cone (1.5") 4 cm
Conus floridana Gabb, 1868.
S.E. United States. Common.
Top: holotype, form *burryae*
Clench, 1942.



Mouse Cone (1.2") 3 cm
Conus mus Hwass, 1792. S.E.
Florida; West Indies; Bermuda.
Rocky shore beaches; locally
common.



Turtle Cone (2.5") 6 cm
Conus ermineus Born, 1778.
Gulf of Mexico to Brazil; West
Africa. Offshore; common.
Syn.: *testudinarius* Hwass.



Clery's Cone (1.5") 4 cm
Conus cleryi Reeve, 1844. Brazil
to N. Argentina. Offshore; un-
common. Syn.: *clenchi* Mar-
tins.



Bermuda Cone (1.5") 4 cm
Conus mindanus Hwass, 1792.
Bermuda to Brazil. Offshore;
locally common. Syn.: *bermudensis* Clench.



Conus mindanus Hwass, 1792.
A confusing species with num-
erous forms, including this
pustulose one. Sometimes
darkly colored.



Villepin's Cone (2.5") 6 cm
Conus villepinii Fischer &
Bernardi, 1857. Florida to Bra-
zil. Deep water; rare. Syn.: *fos-
teri* Cl. & Ag. (holotype).



Glory-of-the-Atlantic (2") 5 cm
Conus granulatus L., 1758. S.E.
Florida and West Indies. Off-
shore rock slabs. 5 to 70 m; un-
common.



Cardinal Cone (1.4") 3.5 cm
Conus cardinalis Hwass, 1792.
Caribbean. Shallow reefs; lo-
cally common. Aperture rose.



Pat's Cone (1") 2.5 cm
Conus patae Abbott, 1971.
South Florida; Jamaica; Baha-
mas. Dredged; rare. Has axial
plications.



Kulkulcan Cone (0.7") 1.8 cm
Conus kulkulcan Petuch, 1980.
Caribbean. Shallow reefs; un-
common. May be a dark form
of *cardinalis*.



Hieroglyphic Cone (0.8") 2 cm
Conus hieroglyphus Duclos,
1833. Netherlands Antilles; Ja-
maica. Shallow water; moder-
ately rare. Syn.: *armillatus* Ad.



Pinpoint Cone (0.8") 2 cm
Conus puncticulatus Hwass,
1792. Caribbean to northern
Brazil. Offshore; common.
Syn.: *columba* Hwass.



Brazil Cone (1") 2.5 cm
Conus beddomei Sowerby,
1901. Central Brazil. Shallow
water; uncommon. Syn.: *brasi-
liensis* Clench.



Maze's Cone (1.8") 4.5 cm
Conus mazei Deshayes, 1874.
South Florida to Brazil. Off-
shore to deep water; moder-
ately rare.



Raines's Cone (0.8") 2 cm
Conus mazei Deshayes, 1874.
Young form with carinate mar-
gins. Form *rainesae* McGinty,
1953. Gulf of Mexico.



Coudert's Cone (1") 2.5 cm
Conus couderti Bernardi, 1860.
Lesser Antilles. Near reefs. 1 to
10 m; rare to uncommon.



Golden Cone (1.8") 4.5 cm
Conus aurantius Hwass, 1792.
Southern Caribbean. Uncom-
mon.



Matchless Cone (2") 5 cm
Conus cedonulli L., 1767. West
Indies. Moderately deep water;
rare.



Caledonica Cone (2") 5 cm
Conus cedonulli form *caledon-
icus* Hwass, 1792. Lesser
Antilles. Rare.



Austin's Cone (2") 5 cm
Conus cancellatus Hwass, 1792.
Gulf of Mexico to Brazil. Off-
shore; uncommon. Syn.: *aus-
tini* Rehder & Abbott.



Stimpson's Cone (1.5") 4 cm
Conus stimpsoni Dall, 1902.
S.E. United States to Yucatan.
Deep water; uncommon. Ho-
lotype illus.



Armored Cone (1.4") 3.5 cm
Conus armiger Crosse, 1858,
form *frisbeyae* Clench & Pulley,
1952 (holotype illus.). Syn.: *ba-
janensis* Usticke; *clarki* R. & A.



Jasper Cone (1") 2.5 cm
Conus jaspideus Gmelin, 1791.
Gulf of Mexico to central Brazil.
Offshore to moderate depths;
common. Highly variable.



Stearns's Cone (0.8") 2 cm
Conus jaspideus Gmelin, 1791.
The relatively narrow and elon-
gate variety, known as *stearnsii*
Conrad, occurs in Florida.



Verrucose Cone (1") 2.5 cm
Conus jaspideus Gmelin, 1791.
This pustuled form is common
in Caribbean. Form *verrucosus*
Hwass.

PANAMIC CONES (EASTERN PACIFIC)

A rich cone fauna exists from
the Gulf of California to north-
ern Ecuador. Many species are
endemic, but some are closely
related to Caribbean cones. A
few are Indo-Pacific escapees.



Kerstitch's Cone (1.5") 4 cm
Conus kerstitchi Walls, 1978.
West Mexico and Baja Califor-
nia. Offshore; rare. Holotype
illustrated.



Tiara Cone (1") 2.5 cm
Conus tiaratus Sowerby, 1833.
West Mexico to Ecuador; Galapagos. Shallow water; common. Syn.: *roosevelti* B. & R.



Magistrate Cone (2.5") 6.5 cm
Conus archon Broderip, 1833.
Gulf of California to Panama. Offshore to 100 m; uncommon. Syn.: *sanguineus* Kiener.



Prince Cone (3.6") 9 cm
Conus princeps L., 1758. Gulf of California to Ecuador. Shallow water; uncommon.



Orange Prince Cone (2.5") 6 cm
Conus princeps L., 1758. Rare form *apogrammatus* Dall, 1910, having fine axial streaks.



Gladiator Cone (1.2") 3 cm
Conus gladiator Broderip, 1833.
Gulf of California to Peru. Shallow water; common.



Purple Cone (2.5") 6 cm
Conus purpurascens Sowerby, 1833. Gulf of California to Peru. Intertidal rock ledges; moderately common.



Spiderweb Cone (1.8") 4.5 cm
Conus lucidus Wood, 1828.
Baja California to Ecuador; Galapagos. Offshore; locally common.



Bosch's Cone (1") 2.5 cm
Conus boschi Clover, 1972.
Oman coast and N.W. Indian Ocean. Offshore; uncommon.



Ribbioned Cone (1.2") 3 cm
Conus vittatus Hwass, 1792.
Gulf of California to Ecuador. Offshore; uncommon. Color pattern variable.



Pear-shaped Cone (4") 10 cm
Conus patricius Hinds, 1843.
Gulf of California to Ecuador. Offshore; common. Syn.: *pyriformis* Reeve.



Ferguson's Cone (4") 10 cm
Conus fergusonii Sowerby, 1873. Gulf of California to Ecuador. Offshore to moderate depths; common.



Orion Cone (1.2") 3 cm
Conus orion Broderip, 1833.
West Mexico to Colombia. Shallow water; rare. Syn.: *drangai* Schwengel.



Arched Cone (1.5") 4 cm
Conus arcuatus Broderip & Sowerby, 1829. Gulf of California to Colombia. Moderately deep water; common.



Recurved Cone (2.5") 6 cm
Conus recurvus Broderip, 1833. W. Mexico to Ecuador. Offshore; common. Name conserved. Syn.: *incurvus* Brod.



Poorman's Cone (2") 5 cm
Conus poormanii Berry, 1968. Gulf of California to Gulf of Panama. Offshore; uncommon.



Virgate Panama Cone (2") 5 cm
Conus virgatus Reeve, 1849. West Mexico to Ecuador. Shallow water; moderately common. Syn.: *signae* Bartsch.



Dall's Cone (1.5") 4 cm
Conus dalli Stearns, 1873. West Mexico to Panama. Uncommon. Holotype illustrated.



Guaymas Cone (2") 5 cm
Conus xanthicus Dall, 1910. Gulf of California. Deep water; rare. Syn.: *chrysocestus* Berry.



Gradated Cone (2.5") 6 cm
Conus gradatus Wood, 1828. Gulf of California to Peru. Offshore; common.



Grooved Cone (1.4") 3.5 cm
Conus tornatus Sowerby, 1833. Gulf of California to Ecuador. Offshore; moderately common.



Interrupted Cone (1.5") 4 cm
Conus ximenes Gray, 1839. Gulf of California to Peru. Intertidal; common. Syn.: *interruptus* Wood.



Wood's Brown Cone (2") 5 cm
Conus brunneus Wood, 1828. Gulf of California; Baja California to Ecuador. Intertidal to moderate depths; common.



Diadem Cone (1.5") 4 cm
Conus diadema Sowerby, 1834. Gulf of California to Panama; Galapagos. Intertidal rocky ledges; moderately common.



Bartsch's Cone (1.5") 4 cm
Conus bartschi Hanna & Strong, 1949. Gulf of California to Costa Rica. Offshore, 10-50 m; moderately rare.

AUGER SHELLS FAMILY TEREBRIDAE

Large family of long, slender shells with many whorls. Smooth or ornamented, often highly colored, they differ from turret-shells by having short anterior canal and narrow aperture. Thin operculum is placed on small foot. Radula with one or two teeth. Sand-dwelling carnivores of warm waters.



Marlinspike (6") 15 cm
Terebra maculata (L., 1758).
Indo-Pacific. In sand, shallow
water; common. Thick and
heavy. Syn.: *maculosa* Pfeiffer.



Subulate Auger (5") 13 cm
Terebra subulata (L., 1767).
Indo-Pacific. In sand, shallow
water; moderately common.
Syn.: *tigreum* Montfort.



Agate Auger (2.5") 6 cm
Terebra achates Weaver, 1960.
Hawaii. 3 to 100 m; uncommon.
Punctate spiral striae.



Spotted Auger (5") 13 cm
Terebra guttata (Röding, 1798).
Indo-Pacific. Shallow water,
sand; uncommon. Syn.: *ocula-
tum* Dillwyn; *loroisi* Deshayes.



Fly-spotted Auger (5") 13 cm
Terebra areolata (Link, 1807).
Indo-Pacific. In sand, shallow
water; moderately common.
Syn.: *muscaria* Lamarck.



Faval Auger (2.7") 7 cm
Terebra senegalensis Lamarck,
1822. West Africa. In sand;
moderately common. Syn.:
faval Orbigny.



Dimidiata Auger (5") 13 cm
Terebra dimidiata (L., 1758).
Indo-Pacific. In sand, shallow
water; common. Syn.: *carnea*
Perry; *splendens* Deshayes.



Sandbeach Auger (2.5") 6 cm
Impages hectica (L., 1758). En-
tire Indo-Pacific. Intertidal
sand beaches; locally com-
mon.



Short Auger (2.5") 6 cm
Terebra chlorata Lamarck, 1822.
Indo-Pacific. Shallow water to
10 m, in sand; moderately com-
mon.



Tiger Auger (2.7") 7 cm
Terebra felina (Dillwyn, 1817).
Indo-Pacific. In sand; moder-
ately common. Syn.: *tigrinum*
Gmelin; *suffusa* Pease.



Argus Auger (2.7") 7 cm
Terebra argus Hinds, 1844. Paci-
fic. In sand; moderately rare.
Syn.: *brachygyra* Pilsbry.



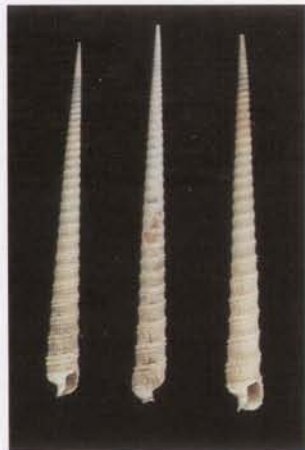
Crenulate Auger (4") 10 cm
Terebra crenulata (L., 1758). Indo-Pacific. In sand, shallow water; moderately common. Syn.: *varicosum* Gmelin.



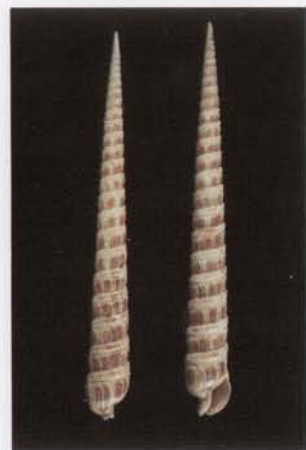
Finely Crenulate Auger (4") 10 cm
Terebra crenulata form *interlineata* Deshayes, 1859. Indian Ocean; uncommon.



Fimbriate Auger (4") 10 cm
Terebra crenulata form *fimbriata* Deshayes, 1857. Knobs usually finer. Intergrades exist. Common.



Triseriate Auger (4") 10 cm
Terebra triseriata Gray, 1834. S.W. Pacific. Shallow water; uncommon. Syn.: *cancellata* Röding.



Splendid Auger (5") 13 cm
Terebra pretiosa Reeve, 1842. Eastern Asia. Moderately rare, especially full grown and perfect.



Many-spotted Auger (3") 7.5 cm
Terebra commaculata (Gmelin, 1791). Indo-Pacific. On sand, shallow water; uncommon. Syn.: *myuros* Lamarck.



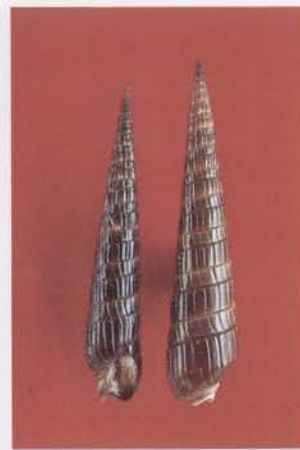
Pencil Auger (1.2") 3 cm
Hastula penicillata (Hinds, 1844). Indo-Pacific. Shallow water; locally common. Syn.: *betsyae* R. D. Burch.



Lance Auger (2.5") 6.5 cm
Hastula lanceata (L., 1767). Indo-Pacific. On sand, shallow water; common. Syn.: *oahuensis* Pilsbry.



Wide-mouth Auger (1.7") 4.5 cm
Hastula stylata (Hinds, 1844). Indo-Pacific. On sand, shallow water; uncommon. Aperture conspicuously dilated.



Duplicate Auger (2") 5 cm
Duplicaria duplicata (L., 1758). Indo-W. Pacific. In sand, shallow water; common. Syn.: *lamarkii* Kiener; *reevei* Desh.



Unrolled Auger (2.5") 6 cm
Duplicaria evoluta (Deshayes, 1859). West Pacific; North Australia. On sand, shallow water; moderately common.



Cerithlike Auger (2") 5 cm
Terebra cerithina Lamarck, 1822. Indo-Pacific. In sand; moderately common. Syn.: *pulchra* Hinds.



Funnel Auger (1.3") 3 cm
Terebra funiculata Hinds, 1844.
Tropical western Pacific. Subtidal to 20 m; uncommon.



Inconstant Auger (1") 2.5 cm
Hastula inconstans (Hinds, 1844). Hawaiian Islands. Steep sand beaches; locally common.



Tricolor Auger (1") 2.5 cm
Terebra tricolor Sowerby, 1825.
Hawaiian Islands. Offshore to 10 m; uncommon.



Perforated Auger (2.5") 6 cm
Terebra pertusa Born, 1778. Bay of Bengal to Hawaii. Offshore to 20 m; uncommon. Syn.: *undata* Blainville.



Babylonian Auger (3") 8 cm
Terebra babylonia Lamarck, 1822. Indo-Pacific. Shallow water to 5 m; common.



Similar Auger (2") 5 cm
Terebra affinis Gray, 1834. Indo-Pacific. Shallow water to 10 m; common. Syn.: *striata* Quoy & Gaimard.



Thaanum's Auger (2") 5 cm
Terebra thaanumi Pilsbry, 1921.
Hawaiian Islands. Offshore, 40-80 m; uncommon.



Undulate Auger (2") 5 cm
Terebra undulata Gray, 1834. S.W. Pacific. Shallow water; uncommon. Syn.: *approximata* Deshayes.



Column Auger (1.6") 4 cm
Terebra columellaris Hinds, 1844. S.W. Pacific. Shallow water; uncommon. Syn.: *propinqua* Pease.



Red-cloud Auger (2") 5 cm
Terebra nebulosa Sowerby, 1825. Tropical Indo-Pacific. Offshore; uncommon.



Dussumier's Auger (2") 5 cm
Terebra dussumieri Kiener, 1839. Korea to China. Shallow water; locally common.



Montgomery's Auger (3") 7 cm
Terebra montgomeryi R. Burch, 1965. Marianas Is. Reefs; rare. Holotype illus.



Shiny Pacific Auger (1") 2.5 cm
Hastula nitida (Hinds, 1844).
S.W. Pacific. Subtidal to 160 m;
common. Syn.: *plicatella*
Deshayes; *cernica* Sowerby.



Hollowed Auger (2") 5 cm
Terebra alveolata Hinds, 1844.
Indo-Pacific. In sand; moder-
ately common.



Radish Auger (2") 5 cm
Duplicaria raphanula (Lamarck,
1822). Indo-Pacific; South Af-
rica. In sand; uncommon.
Syn.: *caledonica* Sowerby.



Gould's Auger (2.3") 5.5 cm
Terebra gouldi Deshayes, 1859.
Hawaiian Chain. Subtidal from
1 to 100 m; locally common.



Common American Auger 4 cm
Terebra dislocata (Say, 1822).
S.E. United States to Brazil; Cal-
ifornia to Panama. Intertidal to
30 m; common.



Little Basket Auger (1.2") 3 cm
Terebra nassula Dall, 1889. West
Indies. Offshore to 1,200 m.
Types illustrated.



Glossema Auger (1") 2.5 cm
Terebra glossema Schwengel,
1940. S.E. Florida; Cuba; Baha-
mas. Offshore to 8 fathoms;
moderately common. Para-
type.



Shiny Atlantic Auger (1.5") 4 cm
Hastula hastata (Gmelin, 1791).
S.E. Florida to Brazil; Bermuda.
Intertidal to 10 m; common.



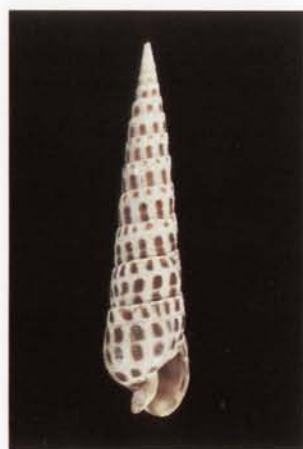
Evelyn's Auger (1.5") 4 cm
Terebra evelynae Clench &
Aguayo, 1939. Northern Cuba.
Deep water; rare. Holotype il-
lustrated.



Gray Atlantic Auger (1.5") 4 cm
Hastula cinerea (Born, 1778).
Florida to Brazil; West Mexico
to Ecuador. Sand beaches;
common. Syn.: *livida* Dill.



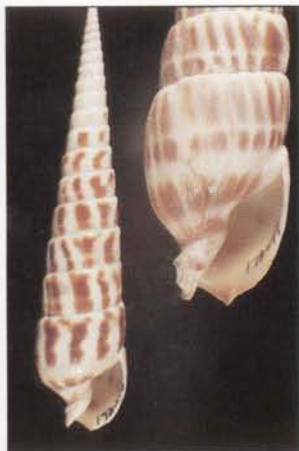
Flame Auger (4.3") 11 cm
Terebra taurina (Lightfoot,
1786). Florida; Texas to Brazil.
On sand offshore; uncommon.
Syn.: *flammea* Lamarck.



Ornate Auger (3.3") 8.5 cm
Terebra ornata Gray, 1834. Gulf
of California to Ecuador; Gala-
pagos. Intertidal and offshore;
moderately common.



Zebra Auger (4") 10 cm
Terebra strigata Sowerby, 1825.
Gulf of California to Galapagos.
Shallow water; moderately
common. Syn.: *zebra* Kiener.



Robust Auger (4.7") 12 cm
Terebra robusta Hinds, 1844.
Baja California to Galapagos.
Shallow water; common. Syn.:
lingualis Hinds.



Variegate Auger (3") 7.5 cm
Terebra variegata Gray, 1834.
Baja California to Ecuador. In
sand, intertidal and offshore;
moderately common.



Ecuadorian Auger (4") 10 cm
Terebra argosysia Olsson, 1971.
Off Ecuador in moderately
deep water. Holotype illustrat-
ed.



Tuberculate Auger (2.4") 6 cm
Terebra tuberculosa Hinds,
1844. West Mexico to Guate-
mala. Intertidal to 45 m; com-
mon.



Roosevelt's Auger (2") 5 cm
Terebra roosevelti Bartsch &
Rehder, 1939. Baja California.
Offshore shallow water; rare.
Holotype illus.



Hancock's Auger (3") 7.5 cm
Terebra hancocki Bratcher &
Burch, 1970. Dredged off west
Panama; rare.

SUBCLASS OPISTHOBANCHIA

Marine snails with both sexes in
each individual (hermaphro-
dite). Gills behind heart. Rarely
with shell or operculum. In-
cludes bubble shells (Bullidae),
sea hares (Aplysiidae), nudi-
branchs. Family Pyramidellidae
has augerlike shells. Many are
parasitic.



Dolabrata Pyram (1.2") 3 cm
Pyramidella dolabrata (L., 1758).
Both Indo-Pacific and Carib-
bean. Shallow sand bays; com-
mon. Syn.: *terebelloides* Ad.



Terebra Pyram (1.2") 3 cm
Pyramidella dolabrata color
form *terebellum* (Müller, 1774).
Indo-Pacific; uncommon.



Needle Pyram (2") 5 cm
Pyramidella acus (Gmelin,
1791). Indo-Pacific. Shallow wa-
ter, sand; common. Syn.: *gut-
tata* Link; *maculosa* Lamarck.



Sulcate Pyram (1.5") 3 cm
Pyramidella sulcata (A. Adams,
1854). Indo-Pacific. Shallow wa-
ter to 10 m; moderately com-
mon.



Tesselate Pyram (1.3") 3 cm
Pyramidella sulcata form *tesselata* (A. Adams, 1854). Indo-Pacific. Shallow water in sand; common.



Marmorate Niso (1") 2.5 cm
Niso marmorata (Sowerby, 1834). Cape Verde Islands; N.W. Africa. Shallow water; uncommon.



Henderson's Niso (1") 2.5 cm
Niso hendersoni Bartsch, 1953. North Carolina to both sides of Florida. 30 to 220 m; rare.



Girdled Niso (0.8") 2 cm
Niso balteata Sowerby, 1900. South Africa. Shallow water. Moderately common. *Niso* is in prosobranch family Melanellidae.



Conrad's Turbonille (0.3") 7 mm
Turbonilla conradi Bush, 1899. West coast of Florida. Shallow water. Locally common. Many species in this genus.



Giant Leucotina (1.5") 3.5 cm
Leucotina gigantea (Dunker, 1877). Japan. Sandy mud, 10 to 50 m; uncommon.



Ventricose Milda (1.3") 3 cm
Milda ventricosa (Guérin, 1830). S.W. Pacific. Shallow water; uncommon.



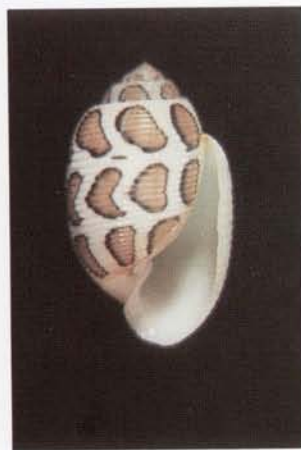
Cat's Ear Otopleura (0.8") 2 cm
Otopleura auriscati (Holten, 1802). S.W. Pacific. Shallow, sandy areas. Uncommon.



Lathe Acteon (1") 2.5 cm
Acteon tornatilis (L., 1767). West Europe and Mediterranean. Shallow water; common.



Striped Acteon (1") 2.5 cm
Acteon virgatus (Reeve, 1842). S.W. Pacific. Shallow water. Rare.



Eloise's Acteon (1") 2.5 cm
Acteon eloisae Abbott, 1973. S.E. Arabia. Shallow water; locally uncommon.



Solid Pupa (1") 2.5 cm
Pupa solidula (L., 1758). Indo-Pacific. Shallow water in sand; common. Syn.: *roseomaculata* Iredale.



Lined Bubble (1") 2.5 cm
Bullina lineata (Gray, 1825). Indo-Pacific. 1 to 30 m; common. Syn.: *nobilis* Habe; *errans* Iredale.



Ampulle Bulla (1.5") 3.5 cm
Bulla ampulla L., 1758. Indo-Pacific. Shallow grass beds; abundant. Family Bullidae.



Common Atlantic Bubble 2.5 cm
Bulla striata Bruguière, 1792. Florida to Brazil; Mediterranean. Intertidal; locally abundant. Syn.: *occidentalis* A. Ad.



Australian Bubble (2") 5 cm
Bulla botanica Hedley, 1918. Australia. Warm shallows; common. Syn.: *australis* Gray, not Ferussac.



White Pacific Atys (1.5") 3.5 cm
Atys naucum (L., 1758). Indo-Pacific. Common. Rarely red-streaked, form *strigata* Pilsbry, 1917. Family Atyidae.



Cylindrical Atys (1") 2.5 cm
Atys cylindricus (Helbling, 1779). Indo-Pacific. Common. Sometimes more slender.



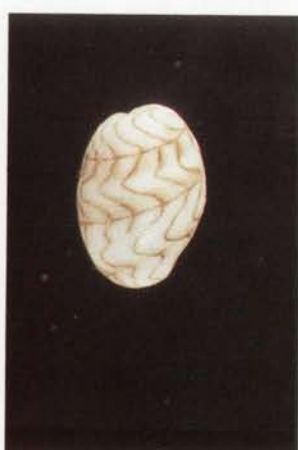
Royal Paper-bubble (1") 2.5 cm
Aplustrum amplustre (L., 1758). Indo-Pacific. Moderately common. Syn.: *fasciatum* Schumacher.



Zoned Paper-bubble (1.5") 4 cm
Hydatina zonata (Lightfoot, 1786). Indo-Pacific. 10 to 50 m; locally uncommon. Syn.: *velum* Gmelin. In Hydatinidae.



Green-lined Paper-bubble 5 cm
Hydatina physis (L., 1758). Indo-Pacific. Common. Similar *H. vesicaria* (Lightfoot, 1786) from Caribbean.



Miniature Melo (0.5") 1.2 cm
Micromelo undatus (Bruguière, 1792). Florida to Brazil. Intertidal, green algae; uncommon.



Say's Paper-bubble (0.5") 1.2 cm
Haminoea solitaria (Say, 1822). Massachusetts to Carolinas. Intertidal grass; abundant.



Woody Canoe-bubble (2.5") 6 cm
Scaphander lignaria (L., 1758). Western Europe. Offshore in sand; locally common.



Giant Canoe-bubble (1.5") 3.5 cm
Scaphander punctostriatus Mighels, 1841. Arctic Seas to N.W. Europe; to West Indies. Offshore; uncommon.



Solute Akera (1.5") 3.5 cm
Akera soluta (Gmelin, 1791). Indo-Pacific. Shallow grass beds; locally common.



Shoulderblade Sea Cat (2") 5 cm
Dolabella auricularia (Lightfoot, 1786). Indo-Pacific and tropical Eastern Pacific. Shell buried in 5 inch (12 cm) animal.



Emerald Bubble (0.3") 7 mm
Smaragdinella calyculata (Brod-erip & Sowerby, 1829). Tropical West Pacific; intertidal algae; common. Syn.: *viridis* Rang.



Umbrella Shell (3") 7.5 cm
Umbraculum umbraculum (Lightfoot, 1786). Indo-Pacific; Caribbean. Rare. Animal (4") 10 cm.

SEA BUTTERFLIES PTEROPODA

Small, pelagic gastropods with fleshy wings for swimming. Abundant in all major seas. A major source of food for some whales. There are 15 genera and about a hundred species, some lacking shells. Shells found at great depths on ocean floor.



Three-toothed Cavoline (0.6") 1.5 cm
Cavolinia tridentata (Niebuhr, 1775). Worldwide; open seas. Abundant.



Uncinate Cavoline (0.6") 1.5 cm
Cavolinia uncinata (Rang, 1829). Worldwide, open seas. More abundant in warm waters.



Three-spined Cavoline (0.4") 1 cm
Diacria trispinosa (Blainville, 1821). Worldwide, open seas. Locally abundant.



Cigar Pteropod (0.2") 5 mm
Cuvierina columnella (Rang, 1827). Worldwide, open seas. Common in the Atlantic.



Pyramid Clio (0.9") 2.2 cm
Clio pyramidata L., 1767. Worldwide, open seas. Many forms, including three from Antarctica.



Cuspidate Clio (0.9") 2.2 cm
Clio cuspidata (Bosc, 1802). Worldwide, pelagic. Abundant.

LAND SNAILS
SUBCLASS PULMONATA

Although most members of this subclass are typical garden and woodland snails that have lungs for breathing air, a number of families are associated with marine and brackish conditions. A few of the better-known species are included here.



New Zealand Titiko (1") 2.5 cm
Amphibola crenata (Gmelin, 1791). New Zealand. Estuarine muds; common. Syn.: *avellana* Bruguière. Operculum present.



Say's False Limpet (0.7") 1.8 cm
Siphonaria alternata Say, 1826. S.E. United States; Bahamas. Intertidal rock shore; common.



Striped False Limpet (1") 2.5 cm
Siphonaria pectinata (L., 1758). Florida to Texas; Caribbean. Intertidal rocks; locally common.



Lesson's False Limpet (1") 2.5 cm
Siphonaria lessoni (Blainville, 1824). Peru; Chile to Brazil. Intertidal rocks; common.



Giant False Limpet (2") 5 cm
Siphonaria gigas Sowerby, 1825. West Mexico to North Peru. Intertidal rocks; common.



White False Limpet (1") 2.5 cm
Trimusculus reticulatus (Sowerby, 1835). Central California to West Mexico. Intertidal rocks; uncommon.



Eastern Melampus (0.6") 1.5 cm
Melampus bidentatus Say, 1822. Quebec to Texas; West Indies. Marsh grasses; abundant.



Banded Melampus (0.4") 1 cm
Melampus fasciatus Deshayes, 1830. Central Pacific. Shady, wooded shores; common.



Yellow Melampus (0.5") 1.2 cm
Melampus luteus Quoy & Gaimard, 1832. Indo-Pacific; estuarine; common.



Bat Cassidula (0.4") 1 cm
Cassidula vespertilionis (Lesson, 1831). Philippine Islands. Mangroves; locally common.



Rugose Cassidula (1") 2.5 cm
Cassidula rugata Menke, 1853. South Australia. Mud shores; locally common.



Midas Ear Cassidula (3") 7.5 cm
Ellobium aurismidae (L., 1758).
S.W. Pacific. Near mangroves;
locally abundant.



Panama Swamp Cassidula
(1") 2.5 cm
Ellobium stagnalis (Orbigny,
1835). El Salvador to Ecuador.
Mangrove swamps; common.



Judas Ear Cassidula (2") 5 cm
Ellobium aurisjudae (L., 1758).
S.W. Pacific. Mangrove
swamps; common.



Cat's Ear Cassidula (1") 2.5 cm
Cassidula aurisfelis Bruguière,
1789. West Australia. Man-
groves; common.



Nucleus Cassidula (0.6") 1.5 cm
Cassidula nucleus (Gmelin,
1791). Indo-Pacific. Mangrove
areas. Common. Syn.: *muste-
lina* Deshayes.



Common Pythia (1.2") 3 cm
Pythia scarabaeus (L., 1758).
S.W. Pacific. Woodland snail;
common. Many forms.



Reeve's Pythia (1.2") 3 cm
Pythia reeveana Pfeiffer, 1853.
Philippine Islands; locally com-
mon.



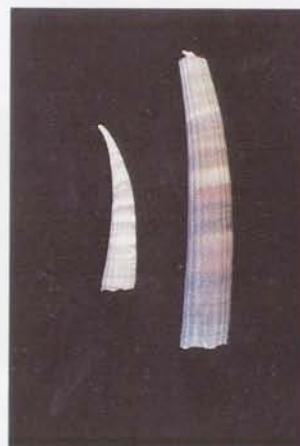
Trigonal Pythia (0.8") 2 cm
Pythia trigonus Troschel, 1840.
Philippine Islands. Locally un-
common.

TUSK SHELLS CLASS SCAPHOPODA

Worldwide in shallow and deep waters, these small shells are open at each end. Water is pumped in and out of the small end which protrudes above the sand. About 1,000 species, many requiring a hand lens to identify. Small slit at narrow end distinguishes some species.



Elephant Tusk (3") 7.5 cm
Dentalium elephantinum (L.,
1758). Southern Philippines to
Japan. 2 to 40 m; common.



Formosan Tusk (2") 5 cm
Dentalium formosum Adams &
Reeve, 1850. Eastern Asia. 1 to
20 m; uncommon. Syn.: *hirasei*
Kira; *festivum* Sowerby.



Vernede's Tusk (6") 15 cm
Dentalium vernedei Sowerby,
1860. East Asia. 20 to 100 m;
common.



Boar's Tusk (2") 5 cm
Dentalium aprinum L., 1766.
Indo-Pacific. 2 to 40 m; com-
mon. Syn.: *taiwanum* Kuroda.



Senegal Tusk (1.5") 3.5 cm
Dentalium senegalense Daut-
zenberg, 1891. West Africa. Un-
common. 11 to 13 ribs.



New Zealand Tusk (2.5") 6 cm
Dentalium zelandicum Sow-
erby, 1860. New Zealand. Wide-
spread in subtidal waters; com-
mon.



Octagonal Tusk (2") 5 cm
Dentalium octangulatum
Donovan, 1804. Indo-Pacific.
Offshore to 100 m; common. 8
rounded ribs.



European Tusk (1") 2.5 cm
Dentalium dentale L., 1766.
Mediterranean and Adriatic.
Shallow to deep water; com-
mon. 18 - 20 ribs.



Common Tusk (2") 5 cm
Dentalium vulgare da Costa,
1778. British Isles to Mediterra-
nean. Intertidal to 1,000 m;
common. No apical notch.



Entale Tusk (2") 5 cm
Dentalium entale L., 1758. N.W.
Europe. Offshore; common.
Subspecies *stimpsoni* Hender-
son, 1920, from New England.



Indian-money Tusk (2") 5 cm
Dentalium pretiosum Sowerby,
1860. Alaska to Baja California.
1 to 150 m; locally abundant.
Formerly used as money.



Half-scratched Tusk (1") 2.5 cm
Dentalium semistriolatum
Goulding, 1834. South Florida
and West Indies. 1 to 200 m;
common.



Ivory Tusk (2") 5 cm
Dentalium eboreum Conrad,
1846. S.E. United States and
West Indies. 1 to 20 m; com-
mon.



Elongate Tusk (3.5") 9 cm
Dentalium longitrsusum Reeve,
1842. Indo-Pacific; common.
Smooth; rarely pinkish.



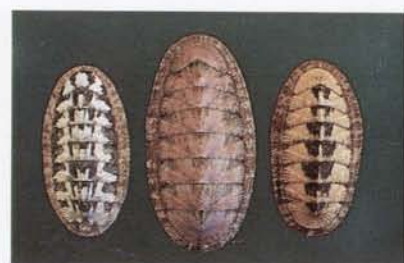
Elephant Cadulus (1") 2.5 cm
Cadulus elephas Henderson,
1920. West Indies. Deep water;
uncommon. End narrows.

CHITONS CLASS POLYPLACOPHORA

Known also as the Coat-of-Mail shells and Amphineura, these mollusks have 8 shelly plates bound at their margins by a girdle which may have scales or bristles. The foot is broad. Identification may depend on removing valves. About 600 living species.



Rugata Chiton (0.6") 1.5 cm
Lepidopleurus rugatus Pilsbry, 1892. Monterey to Baja California. Sublittoral rocks; common.



Many-colored Chiton (1.5") 4 cm
Ischnochiton versicolor (Sowerby, 1840). Australia. Sublittoral. Common. Girdle scales with striae.



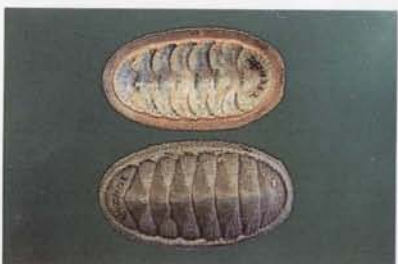
Contracted Chiton (2") 5 cm
Ischnochiton contractus (Reeve, 1874). South Australia. On pen shells; abundant. Multicolored.



Regular Chiton (1.5") 4 cm
Ischnochiton regularis (Carpenter, 1855). Southern California. Intertidal; common. Girdle scales minute, rounded.



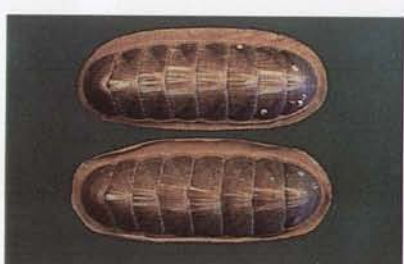
Elongate Chiton (1.5") 4 cm
Ischnochiton elongatus (Blainville, 1825). South Australia; Tasmania. Under rocks; common.



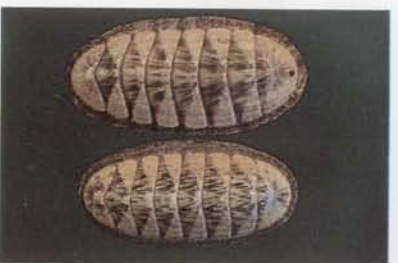
Austral Chiton (2") 5 cm
Ischnochiton australis (Sowerby, 1840). South and eastern Australia. Under littoral rocks; common. Syn.: *lugubris* Gould.



Evanida Chiton (3") 8 cm
Ischnochiton evanida (Sowerby, 1840). Southern Australia; Tasmania. Very common.



Torre's Chiton (1.5") 4 cm
Ischnochiton torrei Iredale & May, 1916. South and West Australia. Common. Girdle orange.



Lineolate Chiton (2") 5 cm
Ischnochiton lineolatus (Blainville, 1825). South and West Australia. Abundant. Syn.: *iredalei* Dupuis.



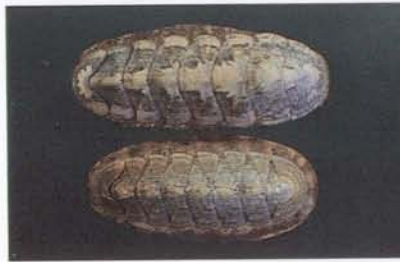
Merten's Chiton (1.5") 4 cm
Lepidozona mertensii (Middendorff, 1847). Alaska to Baja California. Subtidal; common. Color variable.



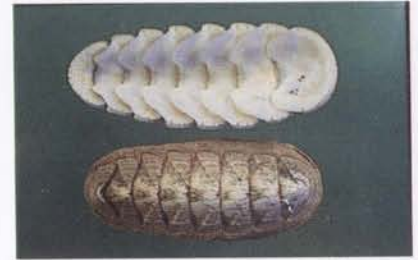
Florida Slender Chiton (1") 2.5 cm
Stenoplax floridana (Pilsbry, 1892). Lower Florida Keys. Intertidal to 1 m; common.



Conspicuous Chiton (5") 12 cm
Stenoplax conspicua (Dall, 1879). California to West Mexico. Intertidal; common.



Magdalena Chiton (3") 7.5 cm
Stenoplax magdalenensis (Hinds, 1845). West Mexico. Variations.



Magdalena Chiton (3") 7.5 cm
Stenoplax magdalenensis (Hinds, 1845). West Mexico. Intertidal; common.



Elevated Chiton (3") 7.5 cm
Stenoplax alata (Sowerby, 1840). S.W. Pacific; Philippines. Intertidal; common.



Veiled Pacific Chiton (1.5") 4 cm
Placiphorella velata Dall, 1879. California to W. Mexico. Intertidal; common.



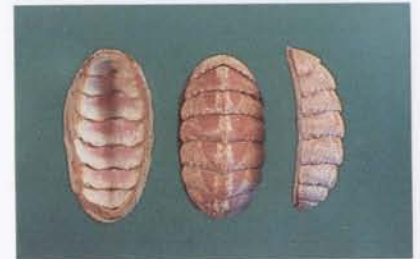
Lined Red Chiton (1.5") 4 cm
Tonicella lineata (Wood, 1815). Japan to Alaska to California. Subtidal to 90 m; common.



Northern Red Chiton (1") 2.5 cm
Tonicella rubra (L., 1767). Arctic Seas to Europe; California and New York. 1 to 200 m; common.



Hidden Chiton (1.2") 3 cm
Tonicella insignis (Reeve, 1847). Alaska to Washington. Common. Syn.: *submarmoreus* Middendorff.



Mottled Red Chiton (1") 2.5 cm
Tonicella marmorea (Fabricius, 1780). Arctic Seas to New England; Europe and Western Canada. Common. Girdle smooth.



Elegant Chiton (2") 5 cm
Tonicia elegans (Frembley, 1827). Chile and Peru. Littoral to 5 m; common.



Neglected Chiton (1.5") 4 cm
Onisthochiton neglectus (Rochebrune, 1881). New Zealand. Littoral rocks. Common. Syn.: *opinionosus* Iredale and Hull.



Forbes's Chiton (2") 5 cm
Tonicia forbesii Carpenter, 1857. West Mexico to Panama. Sublittoral rocks; common. Girdle naked.



Hartweg's Chiton (1.5") 3.5 cm
Cyanoplax hartwegii (Carpenter, 1855). Washington to Baja California. Intertidal; common.



Smooth European Chiton (1") 2.5 cm
Callochiton achatinus (Brown, 1827). N.W. Europe and Mediterranean. Common. Syn.: *laevis* Montagu, not Osbeck.



Eastern American Chiton (0.8") 2 cm
Chaetopleura apiculata (Say, 1830). Massachusetts to Florida. 1 to 20 m; common; on shells and rocks.



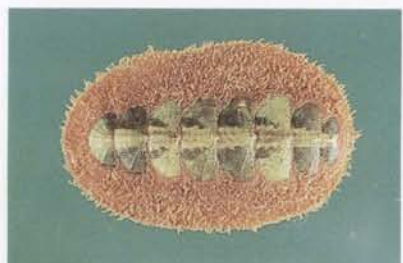
Decorated Chiton (1") 2.5 cm
Callistochiton decoratus Pilsbry, 1893. Central California to West Mexico. Littoral rocks; uncommon.



Albida Chiton (3") 7.5 cm
Plaxiphora albida (Blainville, 1825). Southern Australia. Littoral; common. Girdle hairs broad.



Mossy Mopalia (1.5") 3.5 cm
Mopalia muscosa (Gould, 1846). Alaska to Baja California. Intertidal; common. Syn.: *lignosa* Gould.



Hairy Mopalia (1.5") 3.5 cm
Mopalia ciliata (Sowerby, 1840). Alaska to California. Intertidal; common. Variable colors.



Hairy Mopalia (1.5") 3.5 cm
Mopalia ciliata (Sowerby, 1840). Alaska to California. Variations in color patterns.



Laevior Chiton (1.5") 3.5 cm
Mopalia laevior Pilsbry, 1918. Washington to Baja California. Intertidal. Moderately common.



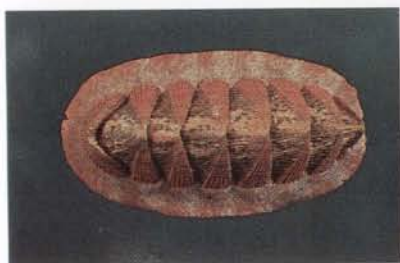
Laevior Chiton (1.5") 3.5 cm
Mopalia laevior Pilsbry, 1918. Shows variation in sculpture and colors.



Acute Chiton (1.5") 3.5 cm
Mopalia acuta Carpenter, 1855. California to Baja California. Intertidal; common. Syn.: *chloris* Dall.



Hinds's Mopalia (3.5") 9 cm
Mopalia hindsii (Reeve, 1847). Alaska to West Mexico. Under intertidal rock ledges; common.



Volvox Chiton (3") 7.5 cm
Lorica volvox (Reeve, 1847). South Australia; New South Wales. Under stones at low tide; uncommon.



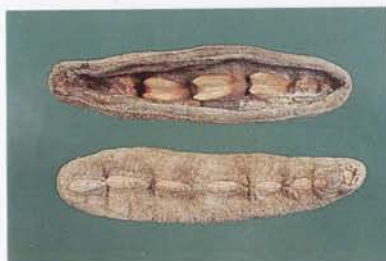
Hauraki Chiton (2.5") 6 cm
Lorica haurakiensis Mestayer, 1921. New Zealand. Intertidal rocks; common.



Angas's Chiton (2") 5 cm
Loricella angasi (H. Adams, in Adams & Angas, 1864). East Australia. Intertidal; uncommon.



Black Katy Chiton (2.5") 6 cm
Katharina tunicata (Wood, 1815). Alaska to S. California. Intertidal; very common.



Striate Slender Chiton (4") 10 cm
Cryptoplax striata (Lamarck, 1819). Southern Australia; Tasmania. Subtidal rocks; common.



Hemphill's Chiton (1") 2.5 cm
Craspedochiton hemphilli (Pilsbry, 1893). Live specimen. Florida Keys. See dried specimen below.



Fuzzy West Indian Chiton (3") 7 cm
Acanthopleura granulata (Gmelin, 1791). South Florida and West Indies. Intertidal rocks; common. Live.



Fuzzy West Indian Chiton (3") 7 cm
Acanthopleura granulata (Gmelin, 1791). Dried specimens.



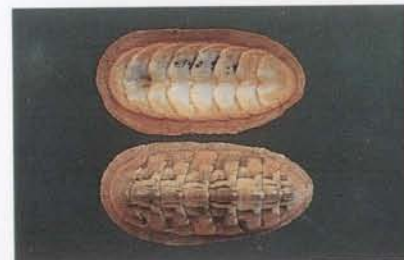
Hemphill's Chiton (1") 2.5 cm
Craspedochiton hemphilli (Pilsbry, 1893). Florida Keys and West Indies. Sublittoral on dead coral; common.



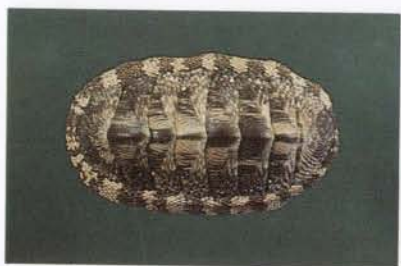
Exquisite Chiton (1.5") 3.5 cm
Acanthochitona exquisita (Pilsbry, 1893). Gulf of California. Uncommon; intertidal.



Oak Chiton (2") 5 cm
Chiton quercinus Gould, 1846. Eastern Australia. Intertidal; common.



Translucent Chiton (2") 5 cm
Chiton translucens Hedley & Hull, 1909. Eastern Australia. Intertidal; common.



West Indian Chiton (2.5") 6 cm
Chiton tuberculatus L., 1758. S.E. Florida and West Indies. Intertidal; common.



Green Chiton (2") 5 cm
Chiton viridis Spengler, 1797. West Indies. Intertidal; common.



Marbled Chiton (2.5") 6 cm
Chiton marmoratus Gmelin, 1791. S.E. Florida and the West Indies. Littoral rocks; common.



White-striped Chiton (1.5") 3.6 cm
Chiton albolineatus Broderip & Sowerby, 1829. West Mexico. Under intertidal rock ledges; uncommon.



Articulate Chiton (3") 7.5 cm
Chiton articulatus Sowerby 1832. West Mexico. Intertidal rocks; moderately common.



Stokes's Chiton (3") 7.5 cm
Chiton stokesii Broderip, 1832. West Mexico to Chile. Intertidal rocks; common.



Magnificent Chiton (4") 10 cm
Chiton magnificus Deshayes, 1844. Chile. Intertidal rocks; locally common.



Squamose Chiton (3") 7.5 cm
Chiton squamosus L., 1764. West Indies. Intertidal; common.



Serpent-skin Chiton (2") 5 cm
Chiton pelliserpentis Quoy & Gaimard, 1835. New Zealand; South Australia; Tasmania. Rocks; common.



Marquesas Chiton (3") 7.5 cm
Chiton marquesanus Pilsbry, 1893. Marquesas Islands; Polynesia. Uncommon.



Sulcate Chiton (4") 10 cm
Chiton sulcatus Wood, 1815. Galapagos Islands. Locally common.



Beautifully-zoned Chiton (3") 7.5 cm
Chiton calliozonus Pilsbry, 1893. Southern Australia; Tasmania. Rocks in sandy pools; common.

CLASS BIVALVIA

Also known as the pelecypods, this class includes the clams, oysters, scallops and other bivalves having two shelly valves hinged at the top. There is no head or radular teeth, and feeding is done by the gills. There are about 10,000 living species, some in rivers and lakes.

AWNING CLAMS FAMILY SOLEMYIDAE

A primitive group of cigar-shaped clams having a glossy periostracum extending beyond the thin shelly valves. The hinge has no true teeth. These clams live in burrows in mud. Some live in shallow water, but others are deep-sea dwellers.



Atlantic Awning Clam (1") 2.5 cm
Solemya velum Say, 1823. Nova Scotia to northern Florida. Shallow water 1 to 12 m in mud; locally common.



Australian Awning Clam (2") 5 cm
Solemya australis Lamarck, 1818. South Australia, Tasmania. Subtidal to 10 m; common.

SUPERFAMILY NUCULACEA

Includes the Nut Clams which have pearly interiors and numerous, fine teeth in the hinge (taxodonts). Includes families Nuculidae, Nuculanidae and Malletiidae. Most of the several hundred species live in very deep water. Some shallow-water species are very common and serve as food for ducks and fish.



Atlantic Nut Clam (0.3") 7 mm
Nucula proxima Say, 1822. Nova Scotia to Texas; Bermuda. Subtidal in sandy mud; abundant.



Sulcate Nut Clam (0.7") 1.8 cm
Nucula sulcata (Bronn, 1831). Norway to Mediterranean. 5 to 2,250 m; common. Syn.: *decussata* Sowerby.



Superb Nut Clam (0.8") 2 cm
Nucula superba Hedley, 1902. N.E. Australia and S.W. Pacific. Subtidal in sand; moderately common.



Rugose Nut Clam (0.3") 7 mm
Nucula rugosa Odhner, 1918. Indian Ocean. In sand, 30 to 40 m; uncommon.



Miraculous Nut Clam (1") 2.5 cm
Nucula mirifica Dall, 1907. Off Japan. 600 m; uncommon.



Divaricate Nut Clam (1") 2.5 cm
Acila divaricata (Hinds, 1843). China and Japan. Offshore; uncommon.



Castrensis Nut Clam (0.5") 1.2 cm
Acila castrensis (Hinds, 1843). Bering Sea to Baja California. 8 to 200 m; common.



Wondrous Nut Clam (1.5") 3.5 cm
Acila mirabilis (Adams and Reeve, 1850). Korea and Japan. Offshore in deep water; uncommon.



Fulton's Nut Clam (1") 2.5 cm
Acila fultoni (E. A. Smith, 1892). Bay of Bengal, India. Deep water; rare.



Coarse Nut Clam (1") 2.5 cm
Scaeoleda illepidia Iredale, 1929. South Australia. Subtidal from 5 to 100 m; locally common.



Polished Nut Clam (1") 2.5 cm
Nuculana polita (Sowerby, 1833). West Panama. 13 to 73 m; uncommon.



Müller's Nut Clam (1") 2.5 cm
Nuculana pernula (Müller, 1771). Arctic Seas around N. America, Europe. Offshore common.



File Yoldia (2") 5 cm
Yoldia limatula (Say, 1831). Nova Scotia to North Carolina. Subtidal, 1 to 10 m; locally common.



Arctic Yoldia (1.2") 3 cm
Yoldia hyperborea Lovén, 1859. Arctic Seas, Alaska to Norway. Deep water; moderately common.



Broad Yoldia (2") 5 cm
Yoldia thraciaeformis Storer, 1838. Arctic North America to N. Carolina and Puget Sound. Offshore; common.



Cooper's Yoldia (1.2") 3 cm
Yoldia cooperi Gabb, 1865. Southern California. Offshore; uncommon.



Scissors Yoldia (1") 2.5 cm
Yoldia scissurata Dall, 1897. Arctic Seas to California. 16 to 150 m; common. Syn.: *ensifera* Dall.



Scissors Yoldia (1") 2.5 cm
Yoldia scissurata (Dall, 1897). This is the holotype of the synonym *Y. ensifera* Dall.



Japanese Yoldia (0.7") 1.8 cm
Portlandia japonica (Adams and Reeve, 1850). Japan. 10 to 250 m on sandy mud; common.



Pointed Nut Clam (0.3") 7 mm
Nuculana acuta (Conrad, 1831). Eastern U.S. to Brazil. Shallow water; abundant.



Pacific Malletia (1") 2.5 cm
Malletia pacifica Dall, 1897. Alaska to California. Offshore, 300 to 650 m; uncommon.



Chilean Malletia (1.5") 3.5 cm
Malletia chilensis Des Moulins, 1832. Chile and Peru. Offshore in moderately deep water; uncommon.

ARK CLAMS FAMILY ARCIDAE

Heavy, squarish, porcelaneous shells living in warm seas. A few live in very deep water. Some spin a byssus which serves as an anchor. The hinge bears numerous taxodont teeth which may vary in number, even within a species. The blackish, horny ligament is helpful in identification. There are about 200 species in the family.



Noah's Ark (2.5") 6 cm
Arca noae L., 1758. Mediterranean; N.W. Africa. Subtidal to 119 m on rocks; common. Variable in shape.



Atlantic Turkey Wing (3") 7 cm
Arca zebra (Swainson, 1833). S.E. United States to Brazil; Bermuda. Shallow rock reefs; common. Syn.: *occidentalis* Philippi.



Panamic Turkey Wing (3") 7 cm
Arca pacifica (Sowerby, 1833). W. Mexico to Peru. Under rocks, subtidal to 137 m; common.



Ventricose Ark (3") 7 cm
Arca ventricosa Lamarck, 1819. S.W. Pacific; Polynesia. Shallow reefs; common.



Mossy Ark (2") 5 cm
Arca imbricata Bruguière, 1789. S.E. United States to Brazil. Shallow reefs, under rocks; common. Syn.: *umbonata* Lamarck.



Indo-Pacific Ark (2.5") 6 cm
Arca navicularis Bruguière, 1789. Indo-Pacific; Japan. Shallow water on rocks; common.



Indo-Pacific Ark (1.5") 3.5 cm
Arca navicularis Bruguière, 1789. Young specimens have more distinct ribs and squarish outline.



Changeable Ark (1.5") 3 cm
Arca mutabilis (Sowerby, 1833). W. Mexico to Ecuador. Subtidal among rocks to 82 m; common.



Four-sided Ark (1.5") 3 cm
Arca tetragona Poli, 1795. Norway to Cape Verde Islands. Subtidal to deep water, on rocks; common.



Hazelnut Ark (1") 2.5 cm
Arca avellana Lamarck, 1819. Indo-Pacific. Shallow reefs; common.



Kobelt's Ark (0.7") 1.8 cm
Arca boucardi Jousseaume, 1894. Japan and Korea. Among rocks, 9 to 80 m. Syn.: *kobeltiana* Pilsbry; common.



Senile Ark (2.5") 6 cm
Senilia senilis (L., 1758). West Africa. Estuarine sands; common. Shell heavy.



Blood Ark (2") 5 cm
Anadara ovalis (Bruguière, 1789). Cape Cod to Texas; to Brazil. Shallow water; common. Syn.: *campechiensis* Gmelin.



Eared Ark (3") 7.5 cm
Anadara notabilis (Röding, 1798). S.E. United States to Brazil. Shallow water; common. Syn.: *deshayesi* Hanley.



Transverse Ark (1.5") 3.5 cm
Anadara transversa (Say, 1822). Cape Cod to Texas. Intertidal to 10 m; common. Syn.: *sulcosa* van Hyning.



Cut-ribbed Ark (5") 12 cm
Anadara floridana (Conrad, 1869). S.E. United States and Greater Antilles. Shallow water; uncommon.



Grand Ark (4") 10 cm
Anadara grandis (Broderip & Sowerby, 1829). W. Mexico to Peru. Near mangroves in black mud; common.



Burnt-end Ark ✱ (2") 5 cm
Anadara uropyg melana (Bory St. Vincent, 1824). Indo-Pacific. Shallow sand to 4 m; locally common.



Scapha Ark (2.5") 6 cm
Anadara scapha (L., 1758). Indo-Pacific. Shallow waters; common.



Antique Ark (2.5") 6 cm
Anadara antiquata (L., 1758). Indo-Pacific. Shallow waters. Common.



Granular Ark (2.5") 6 cm
Anadara granosa (L., 1758). S.W. Pacific.
 Muddy sand, shallow; abundant.



Half-crenate Ark (2.5") 6 cm
Anadara subcrenata (Lischke, 1869). China
 coast, Korea and Japan. Shallow water;
 common.



Hairy Rib Ark (2.5") 6 cm
Anadara setigericosta (Nyst, 1848). Indian
 Ocean; S.E. Asia. Shallow water; uncom-
 mon.



Incongruous Ark (2") 5 cm
Anadara brasiliiana (Lamarck, 1819). S.E.
 United States to Brazil. Shallow water,
 sand; common. Syn.: *incongrua* Say.



Ponderous Ark (2.5") 6 cm
Noetia ponderosa (Say, 1822). Virginia to
 Texas. Shallow water; common. Umbones
 point backwards.



European Bearded Ark (2") 5 cm
Barbatia barbata (L., 1758). Mediterranean
 to N.W. Africa. Subtidal under stones to 280
 m; common.



White Bearded Ark (2") 5 cm
Barbatia candida (Helbling, 1779). S.E.
 United States to Brazil. Shallow reefs, on
 rocks; common.



Decussate Ark (2") 5 cm
Barbatia velata (Sowerby, 1843). Indo-Paci-
 fic. Shallow reefs, on rocks; common.
 Syn.: *decussata* Sowerby; *lima* Sowerby.



Reeve's Ark (3") 7.5 cm
Barbatia reeveana (Orbigny, 1846). W. Mex-
 ico to Peru. Intertidal to 100 m; abundant.
 Syn.: *nova* Mabilie.



Almond Ark (1.5") 3.5 cm
Barbatia amygdalumtostum (Röding, 1798).
 Indo-Pacific. Coral reefs; under rocks;
 abundant. Syn.: *fusca* Bruguière.



Red-brown Ark (1.5") 3 cm
Barbatia cancellaria (Lamarck, 1819). S. Flor-
 ida to Brazil. Intertidal to 4 m among coral
 boulders; common.



Oblique Ark (1.5") 3 cm
Barbatia obliquata (Wood, 1828). Philip-
 pines. Shallow reefs; locally common.



Stone-boring Ark (3") 7.5 cm
Litharca lithodomus (Sowerby, 1833). Nicaragua to Peru. Bores in subtidal rock; locally uncommon.



Hooded Ark (3") 7.5 cm
Cucullaea labiata (Lightfoot, 1786). S.W. Pacific. Offshore to 100 m; locally common. Syn.: *auriculifera* Lamarck.



Hooded Ark (3") 7.5 cm
Cucullaea labiata (Lightfoot, 1786). S.W. Pacific. Interior coloration is variable, sometimes white, purple or brown.



Half-propellor Ark (3") 7.5 cm
Trisidos semitorta (Lamarck, 1819). S.E. Asia; Japan. Shallow water; moderately common.



Propellor Ark (3") 7.5 cm
Trisidos tortuosa (L., 1758). Japan to East Indies. Shallow water; locally common.



Twisted Ark (2") 5 cm
Trisidos torta (Mörch, 1850). China coast. Shallow water; uncommon.



Shaggy Bathyark (1") 2.5 cm
Bathyarca ectocomata (Dall, 1886). Lesser Antilles, West Indies. Deep water, 164 to 320 m; uncommon. Paratype illus.



Bubble Bathyark (1") 2.5 cm
Bathyarca pompholax (Dall, 1908). Off California in deep water; rare.

ALMOND ARKS FAMILY LIMOPSISIDAE

Related to the ark shells, these small, thin, obliquely oval clams are usually covered with a velvety, brown periostracum. The teeth are numerous and about the same size. The ligament is external, small and in the center of the hinge. Most species live in deep water.



Scratched Limopsis (1") 2.5 cm
Limopsis multistriata (Förskal, 1775). Red Sea and Indian Ocean. Offshore; common.



Vagina Limopsis (1.5") 3 cm
Limopsis vaginata Dall, 1891. Bering Sea and Alaska. Offshore; uncommon.



Tajima's Limopsis (1.5") 3 cm
Limopsis tajimae Sowerby, 1914. Off Japan in deep water. Uncommon.



Banded Limopsis (1") 2.5 cm
Limopsis zonalis Dall, 1904. Gulf of Panama. Dredged in 1,000 m; uncommon. Paratype illustrated.



Marion Limopsis (1.5") 3 cm
Limopsis marionensis E. A. Smith, 1885. Antarctic. Dredged offshore; rare.



Ruiz Limopsis (1") 2.5 cm
Limopsis ruizana Rehder, 1971. Off Chile in deep water; rare. Holotype illustrated here.

BITTERSWEET CLAMS
FAMILY
GLCYMERIDIDAE

Like the ark clams these bivalves have taxodont teeth in the hinge. The shells are heavy, compressed and oval. There are about 150 known species, most living in the Indo-Pacific. They prefer shallow water and sand bottoms. They are used for food in Europe and Asia.



Comb Bittersweet (2") 5 cm
Glycymeris pectunculus (L., 1758). Tropical Indo-Pacific. Shallow water; common.



Gold-flowing Bittersweet (2") 5 cm
Glycymeris auriflua (Reeve, 1843). S.W. Pacific. Shallow water; uncommon.



Comb Bittersweet (1") 2.5 cm
Glycymeris pectinata (Gmelin, 1791). S.E. United States to Brazil. Shallow water; common. 20 to 40 fine small ribs.



Silky Bittersweet (1.5") 4 cm
Glycymeris sericata (Reeve, 1843). West Indies. Shallow water, sand. Uncommon.



Unequal Bittersweet (1.5") 3.7 cm
Glycymeris inaequalis (Sowerby, 1833). Gulf of California to Peru. Offshore, 4 to 24 m; common. Syn.: *assimilis* Sowerby.



Muscat Bittersweet (1.5") 3.5 cm
Glycymeris muskatensis Melvill, 1897. N.W. Indian Ocean. Offshore in 5 to 30 m; locally common.



Flat-ribbed Bittersweet (3") 7 cm
Glycymeris laticostata (Quoy & Gaimard, 1835). New Zealand. Shallow water; common.



Clark's Bittersweet (2") 5 cm
Glycymeris clarki (Nicol, 1951). Philippines. Deep water; uncommon. Holotype illustrated.



White-lined Bittersweet (3") 7.5 cm
Glycymeris albolineata (Lischke, 1872). Japan. Offshore from 5 to 20 m; common.



Reeve's Bittersweet (3") 7.5 cm
Glycymeris reevei (Mayer, 1868). S.W. Pacific. Shallow water to 50 m; locally common.



Rayed Bittersweet (2") 5 cm
Glycymeris radians (Lamarck, 1819). South Australia and Tasmania. Subtidal to 300 m; common.



Atlantic Bittersweet (2") 5 cm
Glycymeris undata (L., 1758). S.E. United States to Brazil. Offshore from 2 to 56 m; common.



Violet Bittersweet (2.5") 6 cm
Glycymeris violacescens (Lamarck, 1819). Mediterranean. Shallow water, sand. Common.



Clothed Bittersweet (3") 7.5 cm
Glycymeris vestita (Dunker, 1877). Japan and S.W. Pacific. Shallow water; common.



European Bittersweet (3") 7.5 cm
Glycymeris glycymeris (L., 1758). Norway to the Mediterranean. Offshore; common. Syn.: *orbiculata* Pennant.



Pilose Bittersweet (2.5") 6 cm
Glycymeris pilosa (L., 1767). Mediterranean and Canary Islands. Offshore to 150 m; uncommon.



Decussate Bittersweet (2") 5 cm
Glycymeris decussata (L., 1758). S.E. Florida to Brazil. Shallow water; moderately common.



Pennaceus Bittersweet (2.5") 6 cm
Glycymeris pennacea (Lamarck, 1819). West Indies. Uncommon. Shallow water.



Oblique Bittersweet (2") 5 cm
Glycymeris obliqua (Reeve, 1843). W. Australia. Shallow water; uncommon.



Austral Bittersweet (2") 5 cm
Glycymeris australis (Quoy & Gaimard, 1832). Australia. Shallow water; uncommon.



Giant Bittersweet (4") 10 cm
Glycymeris gigantea (Reeve, 1843). Gulf of California. Offshore from 7 to 13 m; locally common.



American Bittersweet (4.5") 11 cm
Glycymeris americana (De France, 1829). S.E. United States to Brazil. Offshore to 40 m; moderately common.

SEA MUSSELS FAMILY MYTILIDAE

The true mussels are abundant throughout the world, mainly in intertidal and shallow water. The darkly colored, thin, but strong shells have a weak hinge with a few small teeth. Most attach themselves to rocks, but several genera burrow in peat, rocks and corals. The Blue Mussel is a favorite sea-food in Europe.



Common Blue Mussel (3") 7.5 cm
Mytilus edulis L., 1758. Worldwide subarctic seas; United States. Intertidal to 10 m; abundant. Rarely rayed.



Mediterranean Blue Mussel (4") 10 cm
Mytilus galloprovincialis Lamarck, 1819. Western Europe; Mediterranean. Intertidal to 4 m; abundant. Many synonyms.



Green Mussel (2") 5 cm
Perna viridis (L., 1758). Indian Ocean to S.W. Pacific. Shallow water; common. Syn.: *smaragdinus* Gmelin. Single tooth in right valve.



Chorus Mussel (4") 10 cm
Choromytilus chorus (Molina, 1782). Peru to Tierra del Fuego. Intertidal to 3 m on rocks; common. One central tooth.



Perna Mussel (3") 7 cm
Perna perna (L., 1758). West Africa; lower Caribbean. Mangrove roots; locally common. *Chloromya* is a synonym of *Perna*.



Channel Mussel (6") 15 cm
Perna canaliculus (Gmelin, 1791). New Zealand. On subtidal rocks; common.



Black-ribbed Mussel (6") 15 cm
Aulacomya ater (Molina, 1782). Brazil to Chile and Peru. Intertidal to 30 m; common. Syn.: *magellanicus* Gmelin.



Crenate Mussel (2") 5 cm
Aulacomya ater form *crenata* (Lamarck, 1819). A young form of *ater*. Syn.: *americanus* Orbigny.



Maori Mussel (3") 7 cm
Aulacomya ater maoriana (Iredale, 1915). New Zealand. Rocky subtidal; common.



Californian Mussel (8") 20 cm
Mytilus californianus Conrad, 1837. Intertidal to 50 m on rocks; abundant. Ribbed. Syn.: *californicus* Clessin.



Guiana Swamp Mussel (3") 7 cm
Mytella guyanensis (Lamarck, 1819). W. Mexico to Ecuador; Venezuela to Brazil. On stones in muddy intertidal zone; common.



Falcate Swamp Mussel (3") 7 cm
Mytella falcata (Orbigny, 1846). W. Mexico to Ecuador; Venezuela to Uruguay. Mud near mangroves; common.



Box Mussel (1") 2.5 cm
Septifer bilocularis (L., 1758). Indo-Pacific. Intertidal rocks in mud; common. Internal deck at end.



Bifurcate Mussel (1") 2.5 cm
Septifer bifurcatus (Conrad, 1837). California to W. Mexico. Intertidal on rocks; common.



Hooked Mussel (2") 5 cm
Ischadium recurvum (Rafinesque, 1820). Cape Cod to West Indies. Estuarine; intertidal; common. Syn.: *hamatus* Say.



Atlantic Ribbed Mussel (3") 7.5 cm
Geukensia demissa (Dillwyn, 1817). East Canada to Florida; introduced to Calif. Peat marshes; common. Syn.: *plicatulus* Lamarck.



Scorched Mussel (0.7") 1.8 cm
Brachidontes exustus (L., 1758). S.E. United States to Uruguay. Estuarine, intertidal; common.



Impact Mussel (1.5") 4 cm
Modiolarca impacta (Hermann, 1782). New Zealand. In nests under rocks, intertidal; common.



Senhouse's Mussel (1") 2.5 cm
Musculus senhousia (Benson, 1842). East Asia. In eelgrass beds from 1 to 20 m; common.



California Date Mussel (1") 2.5 cm
Adula californiensis (Philippi, 1847). West Canada to southern California. In rocks, shallow water; common.



Philippine Mussel (3") 7.5 cm
Modiolus philippinarum Hanley, 1843. Indo-Pacific. Shallow water flats; abundant.



Northern Horse Mussel (5") 13 cm
Modiolus modiolus (L., 1758). Arctic Seas to New Jersey; to Spain; to California; Japan. Low-tide mark to 10 m; abundant.



False Tulip Mussel (2.5") 6 cm
Modiolus modiolus subspecies *squamosus* Beuiperthuy, 1967. S.E. United States and Caribbean. Umbones not swollen. No rose colors. Common.



Tulip Mussel (3") 7.5 cm
Modiolus americanus (Leach, 1815). S.E. United States; W. Mexico to Peru. Shallow water; abundant. Syn.: *tulipa* Lamarck; *pseudotulipus* Olsson.



European Date Mussel (3.5") 9 cm
Lithophaga lithophaga (L., 1758). France to Mediterranean; Red Sea. Subtidal to 60 m; bores in rock; common.



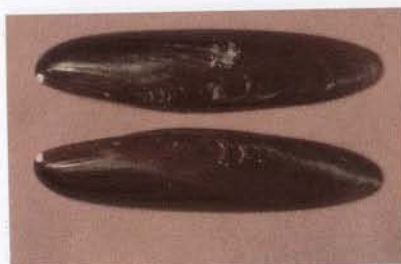
Antillean Date Mussel (4") 10 cm
Lithophaga antillarum (Orbigny, 1842). S.E. Florida to Brazil. Subtidal, soft coral rocks; common. Syn.: *corrugata* Philippi.



Scissor Date Mussel (2") 5 cm
Lithophaga aristata (Dillwyn, 1817). S.E. United States to Brazil; S. Calif. to Peru; Mediterranean. Subtidal in soft rocks; common.



Cylinder Date Mussel (3") 7.5 cm
Lithophaga teres (Philippi, 1846). Indo-Pacific. Shallow water, in soft rocks; common.



Black Date Mussel (2") 5 cm
Lithophaga nigra (Orbigny, 1842). S.E. Florida to Brazil. Shallow water, in coral rocks; common. Syn.: *caribaea* Philippi.



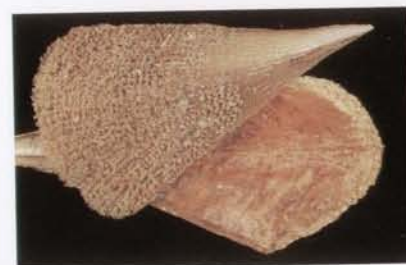
Mahogany Date Mussel (1.5") 3.5 cm
Lithophaga bisulcata (Orbigny, 1842). S.E. United States to Brazil; Bermuda. Common rock-borer. Syn.: *appendiculata* Philippi.



Plume Date Mussel (2") 5 cm
Lithophaga plumula (Hanley, 1844). California to Peru. In rocks and *Spondylus* shells; common. Syn.: *kelseyi* Hertlein & Strong.

PEN SHELLS FAMILY PINNIDAE

Large, thin, but strong, shells, fan-shaped and living buried in sand and gravel. Attached to submerged rocks and shells by a thick, silky byssus. About 25 known species, mostly tropical. *Pinna* with a weak groove in middle of each valve. Absent in *Atrina*.



Noble Pen Shell (24") 60 cm
Pinna nobilis L., 1758. Mediterranean. Off-shore to 20 m; common. Variable sculpture. Syn.: *gigas* Chemnitz.



Prickly Pen Shell (6") 15 cm
Pinna muricata L., 1758. East Africa to Polynesia. Subtidal to 60 m, silty sand, grass; common. Many synonyms; *philippinensis* Reeve.



Bicolor Pen Shell (16") 40 cm
Pinna bicolor Gmelin, 1791. East Africa to Hawaii and Japan. Subtidal to 4 m in sand. Syn.: *atropurpurea* Sowerby. Sometimes rayed.



Rugose Pen Shell (16") 40 cm
Pinna rugosa Sowerby, 1835. W. Mexico to Panama. In mud, intertidal; common.



Rude Pen Shell (20") 50 cm
Pinna rudis L., 1758. Mediterranean to Angola; Caribbean. Offshore in rock crevices; uncommon. Syn.: *pernula* Chemnitz (and Röding).



Amber Pen Shell (10") 26 cm
Pinna carnea Gmelin, 1791. S.E. United States to Brazil. Intertidal to 3 m in sand; common. Syn.: *flabellum* Lamarck.



Saw-toothed Pen Shell (10") 26 cm
Atrina serrata (Sowerby, 1825). S.E. United States and West Indies. Shallow water in sand; common.



Stiff Pen Shell (10") 26 cm
Atrina rigida (Lightfoot, 1786). S.E. United States and Caribbean. Shallow water in sandy mud; common. Syn.: *rigida* Dillwyn.



Comb Pen Shell (10") 26 cm
Atrina pectinata (L., 1767). India, Japan to Fiji. Subspecies *zelandica* (Gray, 1835) from New Zealand. Common. Syn.: *japonica* Reeve, and others.



Tuberculose Pen Shell (8") 20 cm
Atrina tuberculosa (Sowerby, 1835). W. Mexico to Panama. Shallow water; sandy mud; locally common.



Half-Naked Pen Shell (8") 20 cm
Atrina seminuda (Lamarck, 1819). S.E. United States to Argentina. Offshore; common. Syn.: *patagonica* Orbigny.



Indo-Pacific Pen Shell (16") 40 cm
Atrina vexillum (Born, 1778). East Africa to Polynesia. Subtidal from 1 to 60 m; common. Syn.: *nigra* Dillwyn; *tenuis* Habe.



Baggy Pen Shell (8") 20 cm
Streptopinna saccata (L., 1758). Entire Indo-Pacific. Among rocks and crevices on reefs; uncommon. Syn.: *inusitata* Iredale.

WINGED OYSTERS
PEARL OYSTERS
FAMILY PTERIIDAE

A large family of tropical oysters having mother-of-pearl interiors. A strong byssus spun by the foot attaches the oysters to rocks, gorgonian stems and wharf pilings. Pearls from the genus *Pinctada* are of gem quality. Family Isognomonidae has many teeth in the hinge.



Penguin Wing Oyster (3") 7 cm
Pteria penguin (Röding, 1798). Indo-Pacific. Shallow water; common. Syn.: *macroptera* Lamarck.



Penguin Wing Oyster (10") 25 cm
Pteria penguin form *litorium* (Lamarck, 1819). Larger specimens lack long wings. Common.



Golden Wing Oyster (3") 7.5 cm
Pteria crocea (Lamarck, 1819). Central Pacific; Philippines. Shallow water; uncommon.



Atlantic Wing Oyster (3") 7.5 cm
Pteria colymbus (Röding, 1798). S.E. United States to Brazil. Attaches to alcyonarians, 1 to 5 m; common. Syn.: *atlantica* Lamarck.



European Wing Oyster (3") 7.5 cm
Pteria hirundo (L., 1758). W. Europe; Mediterranean. Offshore in 1 to 290 m; common. Syn.: *tarentina* Lamarck.



Loven's Wing Oyster (1.5") 4 cm
Pteria loveni (Dunker, 1872). Japan; Western Pacific. Attached to seaweeds 3 to 80 m; common.



Western Wing Oyster (3") 7.5 cm
Pteria sterna (Gould, 1851). S. California to Peru. Subtidal to 30 m; common. Syn.: *peruviana* Reeve.



Black Wing Oyster (3") 7.5 cm
Pteria avicula (Holten, 1802). S.W. Pacific. Shallow water; common. Syn.: *peasei* Dunker.



Black Wing Oyster * (3") 7.5 cm
Pteria avicula (Holten, 1802). S.W. Pacific. Shallow water; common. Syn.: *peasei* Dunker.



Bearded Wing Oyster (2") 5 cm
Pteria longisquamosa (Dunker, 1852). West Indies. Offshore in shallow water; uncommon. Syn.: *viridizona* Dall.



Pearl Oyster (8") 20 cm
Pinctada margaritifera (L., 1758). Indo-Pacific. Offshore 5 to 30 m; locally common. Source of pearls.



Atlantic Pearl Oyster (3") 7.5 cm
Pinctada imbricata Röding, 1798. S.E. United States to Brazil. Shallow water; common. Syn.: *radiata* Leach.



Lister's Tree Oyster (2") 5 cm
Isognomon radiatus (Anton, 1839). S. Florida, Texas, West Indies to Brazil. Intertidal rock flats; common. Syn.: *listeri* Hanley.



Saddle Tree Oyster (4") 10 cm
Isognomon ehippium (L., 1758). Indo-Pacific. Muddy estuaries; common on rocks intertidally.



Flat Tree Oyster (3") 7.5 cm
Isognomon alatus (Gmelin, 1791). Florida to Brazil; Bermuda. Near mangroves, on rocks; common.



Pacific Tree Oyster (4") 10 cm
Isognomon isognomum (L., 1758). Indo-Pacific. Intertidal to 2 m; common. Genus is in family Isognomonidae.



Rayed Tree Oyster (3") 7.5 cm
Isognomon perna (L., 1767). Indo-Pacific. Shallow reefs; common. Syn.: *costellata* Conrad.



Two-toned Tree Oyster (1.5") 4 cm
Isognomon bicolor (C. B. Adams, 1845). Shallow water, in rock crevices; common. Syn.: *chemnitzianus* Orbigny.

HAMMER OYSTERS FAMILY MALLEIDAE

Unlike the Isognomonidae which have numerous alternating teeth and ligamental blocks, this family has a large, oblique ligament at the center of the hinge. The hinge is often produced at each side, thus giving some species a "hammer" shape. The interior is semi-nacreous. Most live in tropical waters, on reef flats or in crevices of coral rocks.



Sponge Finger Oyster (2.5") 6 cm
Vulsella vulsella (L., 1758). Indo-Pacific. Shallow water in sponges; uncommon. Syn.: *lingulata* Lamarck.



Sponge Finger Oyster (2.5") 6 cm
Vulsella vulsella form *lingulata* Lamarck, 1801. More elongate and rayed than the typical form. Rare.



White Hammer Oyster (8") 20 cm
Malleus albus Lamarck, 1819. Indo-Pacific. Shallow water on grass and rock flats; common.



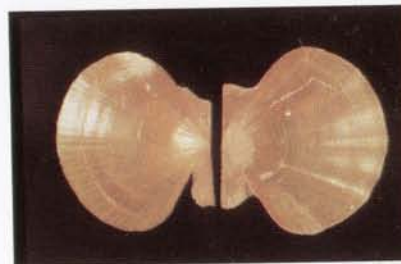
Common Hammer Oyster (8") 20 cm
Malleus malleus (L., 1758). Indo-Pacific. Shallow water; common. Syn.: *vulgaris* Lamarck.



American Hammer Oyster (1.5") 4 cm
Malvumalleus candeanus (Orbigny, 1842). S.E. United States; West Indies. Coral rock crevices; locally common.

SCALLOPS
FAMILY PECTINIDAE

A large and popular family, both as collectors' items and as food. The genera are very complex and the divisions are arbitrary. Amateur collectors may call them all *Pecten*. Many species are capable of swimming by snapping their valves. Most species are tropical, but a few live in polar waters. Sculpture differs on opposite valves.



Hyaline Scallop (1") 2.5 cm
Lissopecten hyalinus (Poli, 1795). W. Europe; Mediterranean. Shallow water; common.



Siboga Glass Scallop (2") 5 cm
Propeamussium sibogai Dautzenberg & Bay, 1912. Japan; deep water; common.



Watson's Glass Scallop (2.5") 6 cm
Propeamussium watsoni (E. A. Smith, 1885). East Indies. Deep water; rare.



Alcock's Glass Scallop (2") 5 cm
Propeamussium alcocki (E. A. Smith, 1885). Bay of Bengal, India. 1400 m; rare.



Dall's Glass Scallop (2") 5 cm
Propeamussium dalli (E. A. Smith, 1886). Gulf of Mexico and West Indies. Deep water; uncommon in collections.



Colbeck's Scallop (3") 7.5 cm
Adamussium colbecki (E. A. Smith, 1902). Antarctic waters. Dredged in 200 m; locally common.



Asian Moon Scallop (3") 7.5 cm
Amusium pleuronectes (L., 1758). S.W. Pacific, India, Japan. Offshore to 30 m; abundant.



Australian Moon Scallop (3") 7.5 cm
Amusium pleuronectes subspecies *australiae* Habe, 1964. N. Australia; offshore; common.



Japanese Moon Scallop (4") 10 cm
Amusium japonicum (Gmelin, 1791). Japan. Offshore in 10 to 100 m; common.



Ballot's Moon Scallop (4") 10 cm
Amusium japonicum subspecies *balloti* (Bernardi, 1861). New Caledonia and N. Australia. Common.



Smudged Moon Scallop (1.5") 4 cm
Amusium oblitteratum (L., 1758). South China Sea. Offshore; rare.



Laurent's Moon Scallop (3") 7.5 cm
Amusium laurenti (Gmelin, 1791). Caribbean. Offshore in 50 to 200 m; uncommon.



Paper Moon Scallop (2") 5 cm
Amusium papyraceum (Gabb, 1873). Gulf of Mexico to Brazil. Offshore in 50 to 120 m; locally common.



Kelp Scallop (1") 2.5 cm
Leptopecten latiauratus (Conrad, 1837). California to W. Mexico. On kelp weeds; common. Syn.: *monotimeris* Conrad.



Bald Scallop (2.5") 6 cm
Proteopecten glaber (L., 1758). Portugal to the Adriatic. Offshore, 6 to 900 m; common. Syn.: *distans* Lamarck.



Club Scallop (1") 2.5 cm
Peplum clavatum (Poli, 1795). W. Europe to Mediterranean. Offshore, 5 to 1,000 m; common. Syn.: *inflexum* Poli.



Great Scallop (5") 12 cm
Pecten maximus (L., 1758). N.W. Europe to Madeira. Offshore, 3 to 1,000 m; common edible scallop. Syn.: *vulgaris* da Costa.



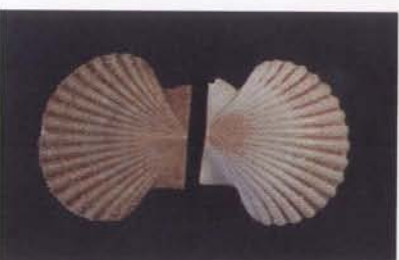
St. James's Scallop (5") 12 cm
Pecten maximus subspecies *jacobaeus* (L., 1758). Mediterranean; Canary Is. Offshore, 5 to 100 m; common, edible.



Keppel's Scallop (4") 10 cm
Pecten keppelianus Sowerby, 1905. Cape Verde Islands. Shallow water; uncommon.



Triple-ridged Scallop (1.5") 4 cm
Serratovola tricarinata (Anton, 1839). Philippines, East Indies. Offshore to 50 m; uncommon. Syn.: *passerina* Hinds.



File Scallop (1.5") 4 cm
Pecten aspera Sowerby, 1842. Melanesia. Shallow water; uncommon.



Box Scallop (2") 5 cm
Pecten pyxidata Born, 1780. Indo-Pacific. Shallow water; common.



Chinese Scallop (1.5") 3.5 cm
Pecten sinensis Sowerby, 1842. China and Japan. Shallow water; common. Syn.: *punctulatus* Dunker.



Japanese Baking Scallop (3") 8 cm
Pecten albicans Schröter, 1802. China and Japan. Offshore, 10 to 80 m; abundant. Syn.: *laqueatus* Sowerby.



Tasmanian Scallop (3") 8 cm
Pecten meridionalis Tate, 1887. Tasmania; S. Australia. Offshore; common.



New Zealand Scallop (4") 10 cm
Pecten novaezelandiae Reeve, 1853. New Zealand. Intertidal to offshore; common.



Zigzag Scallop (3") 7.5 cm
Pecten ziczac (L., 1758). S.E. United States to Brazil; Bermuda. 1 to 40 m; locally common. Rarely albino.



Ravenel's Scallop (2") 5 cm
Pecten raveneli Dall, 1898. S.E. United States and West Indies. Offshore; locally common. Many colors.



Chazalie's Scallop (1") 2.5 cm
Pecten chazaliei Dautzenberg, 1900. S. Florida to Brazil. Offshore from 20 to 150 m; uncommon. Syn.: *tereinus* Dall.



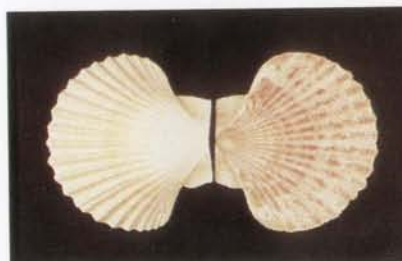
Tumbez Scallop (2") 5 cm
Pacipecten tumbezensis (Orbigny, 1846). W. Mexico; Offshore to 90 m; uncommon.



San Diego Scallop (3") 7.5 cm
Pecten diegensis Dall, 1898. California and W. Mexico. Offshore to 150 m; uncommon.



Vogdes's Scallop (4") 10 cm
Pecten vogdesi Arnold, 1906. W. Mexico to Panama. Offshore to 155 m; common.



Silken Scallop (2.5") 6 cm
Pecten sericeus Hinds, 1845. W. Mexico to Peru; Galapagos. 13 to 155 m; uncommon.



Lunar Mexican Scallop (3") 7.5 cm
Pecten lunaris S. S. Berry, 1963. W. Mexico. 55 to 82 m; uncommon. Paratype illustrated.



Sunburst Scallop (1.5") 4 cm
Aequipecten heliacus (Dall, 1925). S. Florida and West Indies; rare. Holotype illustrated.



Giant Pacific Scallop (8") 25 cm
Patinopecten caurinus (Gould, 1850). Alaska to California. Offshore; locally abundant. Commercially fished.



Atlantic Deepsea Scallop (8") 25 cm
Placopecten magellanicus (Gmelin, 1791). Labrador to N. Carolina. Offshore; commercially fished.



Yesso Scallop (7") 22 cm
Patinopecten yessoensis Jay, 1857. N. Japan. Offshore; common.



Leopard Scallop (2.5") 6 cm
Annachlamys leoparda (Reeve, 1853). Northern Australia. Offshore in shallow water; uncommon.



Convex Scallop (2") 5 cm
Mesopeplum convexum (Quoy & Gaimard, 1835). New Zealand. Offshore; uncommon.



Tasman Scallop (2.5") 6 cm
Notochlamys tasmanica (Adams & Angas, 1863). Tasmania and South Australia. 20 to 80 m; uncommon.



Carol's Scallop (2") 5 cm
Mesopeplum caroli Iredale, 1929. Eastern Australia. Offshore to 160 m; locally common.



Reeve's Scallop (2") 5 cm
Annachlamys reevei (Adams and Reeve, 1850). S.W. Pacific. Offshore to 30 m; locally common.



Macassar Scallop (3") 7 cm
Annachlamys macassarensis Chenu, 1845. S.W. Pacific. Offshore to 30 m; uncommon.



Queen Scallop (3") 7 cm
Aequipecten opercularis (L., 1758). N.W. Europe to Azores and Mediterranean. Common; edible.



Swift's Scallop (3.5") 8 cm
Swiftopecten swiftii (Bernardi, 1858). Japan. Offshore to 50 m; locally common.



Spathate Scallop (1") 2.5 cm
Aequipecten phrygium (Dall, 1886). S.E. United States and the West Indies. Offshore, deep water; uncommon.



Wavy-lined Scallop (2") 5 cm
Aequipecten lineolaris (Lamarck, 1819). S.E. Florida and Caribbean. Offshore, 14 to 100 m; uncommon.



European Calico Scallop (1.2") 3 cm
Argopecten solidulus (Reeve, 1853). Mediterranean and West Africa. Offshore; common. Syn.: *commutatus* Monterosato.



European Calico Scallop (1.2") 3 cm
Argopecten solidulus (Reeve, 1853). Coloration variable. Lower valve usually lighter in color. Mediterranean specimen.



Distant Scallop (1.5") 4 cm
Comptopallium vexillum (Reeve, 1853). Indo-Pacific. Shallow water; uncommon. Syn.: *digitatus* Hinds; *zeteki* Hertlein; *evecta* Iredale.



Strange's Scallop (1.5") 4 cm
Comptopallium strangei (Reeve, 1852). N.E. Australia. Shallow water; uncommon.



Plicate Scallop (1.5") 4 cm
Decatopecten plicus (L., 1758). Western Pacific; S. Japan. Offshore; common.



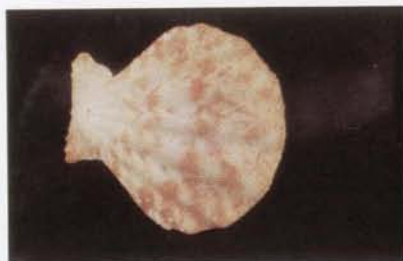
Cloak Scallop (2") 5 cm
Decatopecten amiculum (Philippi, 1835). Indo-Pacific. Shallow water; uncommon.



Nodular Scallop * (2") 5 cm
Decatopecten noduliferus (Sowerby, 1842). Indo-Pacific. Offshore to 100 m; uncommon. Syn.: *langfordi* Dall, B. & R.



***Nodular Scallop** (2") 5 cm
Decatopecten noduliferus (Sowerby, 1842). Holotype of *langfordi* Dall, Bartsch and Rehder, 1938, from Hawaii.



Spicer's Scallop (1.5") 4 cm
Comptopallium spiceri Rehder, 1944. Line Islands (south of Hawaii). Rare. Holotype illustrated.



Radula Scallop (3") 7.5 cm
Comptopallium radula (L., 1758). Indo-Pacific. Shallow reefs; common.



Patagonian Scallop (3") 7 cm
Chlamys lischkei (Dunker, 1850). Argentina and Chile. Offshore; abundant. Syn.: *patagonica* King.



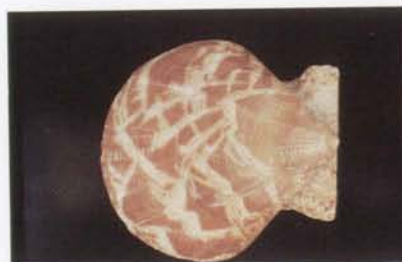
Histronic Scallop (1.5") 4 cm
Excellichlamys histrionica (Gmelin, 1791). Western Tropical Pacific. Shallow water; uncommon.



Blood-stained Scallop (1") 2.5 cm
Excellichlamys sanguinolenta (Gmelin, 1791). Red Sea and N.W. Indian Ocean. Shallow water; uncommon.



Spectacular Scallop (1") 2.5 cm
Excellichlamys spectabilis (Reeve, 1853). S.W. Pacific; Japan. Offshore to 10 m; uncommon.



Felippone's Scallop (2.5") 6 cm
Aequipecten felipponei (Dall, 1922). Uruguay and Argentina. Offshore; common.



Gardner's Scallop (1.5") 3.5 cm
Serratovola gardneri (E. A. Smith, 1903). Indo-Pacific. Shallow water; uncommon. Syn.: *dayriti* Grau.



Link's Scallop (1.5") 3.5 cm
Pacipecten leucophaeus (Reeve, 1852). Lower Caribbean. Dredged offshore; locally common. Syn.: *linki* Dall, 1926.



All's Scallop (1") 2.5 cm
Cryptopecten alli Dall, Bartsch & Rehder, 1938. Hawaiian Islands. Deep water; rare. Holotype illustrated.



Singapore Scallop (1.5") 3.5 cm
Volachlamys singaporina (Sowerby, 1842). S.E. Asia. Shallow water; uncommon.



Tranquebar Scallop (1.5") 3.5 cm
Volachlamys tranquebarica (Gmelin, 1791). Indian Ocean. Shallow flats to 6 m; common.



Tiger Scallop (2") 5 cm
Semipallium tigris (Lamarck, 1819). Western Pacific; S. Japan. Shallow water; common.



Mel Ward's Scallop (2.5") 6 cm
Semipallium wardiana Iredale, 1939. North and Western Australia. Under rocks on reefs. Uncommon.



Rough American Scallop (1.2") 3 cm
Aequipecten muscosus (Wood, 1828). S.E. United States to Brazil. Common. Rarely lemon-yellow. Syn.: *exasperatus* Sowerby.



Thistle Scallop (1") 2.5 cm
Aequipecten acanthodes (Dall, 1925). S.E. Florida and Caribbean. Grass flats; uncommon. Holotype illus.



Magnificent Scallop (7") 17 cm
Lyropecten magnificus (Sowerby, 1835). Galapagos Islands. Offshore, 3 to 50 m; uncommon.



Specious Scallop (1.5") 4 cm
Cryptopecten speciosum (Reeve, 1853). Western Pacific; S. Japan. Shallow water; uncommon. Syn.: *Gloriopallium*.



Royal Cloak Scallop (2") 5 cm
Cryptopecten pallium (L., 1758). Indo-Pacific. Shallow water on reefs; common.



Senatorial Scallop (3") 7.5 cm
Chlamys senatoria (Gmelin, 1791). S.E. Asia and Indian Ocean. Offshore; common.



Noble Scallop (3") 7.5 cm
Chlamys senatoria subspecies *nobilis* (Reeve, 1852). Japan. Offshore to 20 m; locally abundant. Many colors.



Glorious Scallop (3") 7.5 cm
Chlamys gloriosa (Reeve, 1852). Japan and S. Korea. Offshore; uncommon.



Townsend's Scallop (6") 15 cm
Chlamys townsendi (Sowerby, 1895). N.W. Indian Ocean. Offshore to 20 m; common.



Lion's Paw (4.5") 11 cm
Lyropecten nodosa (L., 1758). S.E. United States to Brazil; Ascension Is. Offshore to 30 m; locally common.



Austral Scallop (2.5") 6 cm
Chlamys australis (Sowerby, 1847). Western and S. Australia. Offshore; common.



Prickly Scallop (3") 7 cm
Chlamys asperima (Lamarck, 1819). S. Australia; Tasmania. Subtidal to 100 m; abundant.



Atlantic Bay Scallop (2.5") 6 cm
Argopecten irradians irradians (Lamarck, 1819). Massachusetts to New Jersey. Shallow grass areas; abundant.



Carolina Bay Scallop (2.5") 6 cm
Argopecten irradians subspecies *concentricus* (Say, 1822). Maryland to Louisiana. Abundant. Lower valve white, fatter.



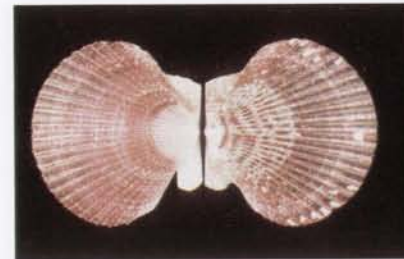
Texas Bay Scallop (2.5") 6 cm
Argopecten irradians subspecies *amplicostatus* (Dall, 1898). Texas to Colombia. Common. 15 ribs.



Nucleus Scallop (1.2") 3 cm
Argopecten nucleus (Born, 1778). S.E. Florida and Caribbean. Shallow water; common. Ears with 5 riblets.



Calico Scallop (2.5") 6 cm
Argopecten gibbus (L., 1758). S.E. United States to Brazil. Shallow water to 30 m; abundant. Syn.: *dislocatus* Say.



Purplish Scallop (5") 13 cm
Argopecten purpuratus (Lamarck, 1819). Peru to Chile. Sandy bottom, to 30 m; abundant. Commercially fished.



Circular Scallop (4") 10 cm
Argopecten circularis (Sowerby, 1835). W. Mexico to Peru. Subtidal to 100 m; abundant. Food species.



Hirasé's Scallop (2.5") 6 cm
Argopecten hirasei (Bavay, 1904). Japan. Shallow water; common. Syn.: *awajiensis* Pilsbry.



Unequal Scallop (1") 2.5 cm
Argopecten inaequalis (Sowerby, 1842). Western Pacific; Japan. Offshore, 10 to 50 m; uncommon.



African Fan Scallop (2") 5 cm
Chlamys flabellum (Gmelin, 1791). West Africa from Mauritania to Angola. Shallow water; moderately common.



St. Helena Scallop (1") 2.5 cm
Aequipecten atlanticus (E.A. Smith, 1890). St. Helena Is., Atlantic. Offshore; rare. Holotype illustrated.



Tryon's Scallop (2") 5 cm
Aequipecten glyptus (Verrill, 1882). S.E. United States. Dredged by shrimpers in the Gulf of Mexico; uncommon.



Dr. Ruschenberger's Scallop (3") 7.5 cm
Chlamys ruschenbergerii (Tryon, 1869). N.W. Indian Ocean. Offshore, moderately common. Syn.: *decoriata* Lamy.



Much-scaled Scallop (2") 5 cm
Chlamys multisquamata (Dunker, 1864). S.E. Florida, Bahamas and Cuba. Rock crevices, 10 to 50 m; rare.



Dieffenbach's Scallop (2.5") 6 cm
Chlamys dieffenbachi (Reeve, 1853). New Zealand. Offshore; common. Syn.: *celator* Finlay.



Iceland Scallop (3.5") 8 cm
Chlamys islandica (Müller, 1776). Arctic Seas to Massachusetts; to Washington State; to N. Europe. Abundant.



Wainwright Scallop (3") 7.5 cm
Chlamys wainwrightensis MacNeil, 1967. Alaska. Offshore. Holotype illus. May be form of *islandica*.



Kitten Scallop (1") 2.5 cm
Camptonectes tigrinus (Müller, 1776). W. Europe; cold waters; common. Syn.: *tridatus* Müller; *laevis* Pennant.



Striate Scallop (0.6") 1.5 cm
Camptonectes striatus (Müller, 1776). Arctic Seas; W. Europe, cold water, 7 to 80 m; common. Syn.: *rimulosa* Philippi.



Seven-rayed Scallop (1.5") 3.5 cm
Pseudamussium septemradiatum (Müller). Arctic European seas to W. Europe. Cold waters, 11 to 180 m; common.



Variable Scallop (2.5") 6 cm
Chlamys varia (L., 1758). Norway to Mediterranean. Offshore, 1 to 1000 m; common. Syn.: *monotis* da Costa.



Snow Scallop (2.5") 6 cm
Chlamys nivea (Mac Gillivray, 1825). N. Great Britain. Offshore; locally common. About 45 riblets.



Sulcate Scallop (1.7") 4 cm
Chlamys sulcata (Müller, 1776). Arctic Seas; N.W. Europe. Offshore to 850 m; common.



Cat's Paw Scallop (2.5") 6 cm
Manupecten pesfelis (L., 1758). Mediterranean and N.W. Africa. Offshore, 10 to 225 m; common. Syn.: *corallinus* Poli.



Palmer's Scallop (1.5") 4 cm
Aequipecten palmeri (Dall, 1897). Gulf of California. Intertidal to 90 m; uncommon.



Superb Scallop (2.5") 6 cm
Anguipecten superbus (Sowerby, 1842). S.W. Pacific and Japan. 10 to 80 m; uncommon.



Lambert's Scallop (2.5") 6 cm
Anguipecten lamberti (Souverbie, 1874). S.W. Pacific to Hawaii. Shallow water to 600 m; uncommon. Syn.: *gregoryi* D., B. & R.



Buried Scallop (2") 5 cm
Chlamys funebris (Reeve, 1853). Australia. Shallow water. Uncommon.



Tinted Scallop (1.3") 3 cm
Chlamys tincta (Reeve, 1853). Table Bay to Natal, South Africa. Also red, violet and mottled.



Tinted Scallop (1.3") 3 cm
Chlamys tincta (Reeve, 1853). Variations in color in this common South African scallop.



Beribboned Scallop (2") 5 cm
Chlamys lemniscata (Reeve, 1853). S. Japan and S.W. Pacific. Offshore, 30 to 300 m; uncommon.



Squamose Scallop (2.5") 6 cm
Chlamys squamosa (Gmelin, 1791). S.W. Pacific. Shallow water; common.



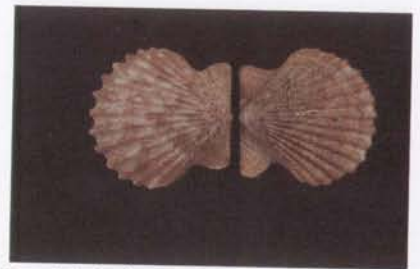
Scaly Pacific Scallop (3") 7.5 cm
Chlamys squamata (Gmelin, 1791). Japan and W. Pacific. Offshore from 1 to 50 m; uncommon.



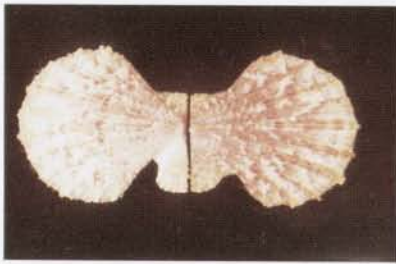
Ghostly Scallop (1.5") 4 cm
Chlamys larvata (Reeve, 1853). Japan. Offshore; common. Syn.: *ootanii* Azuma.



Darwin's Scallop (2") 5 cm
Chlamys tehuelchus (Orbigny, 1846). Brazil to Argentina. Offshore, 10 to 120 m; common. Syn.: *darwini* Reeve.



Darwin's Scallop (2") 5 cm
Chlamys tehuelchus (Orbigny, 1846). Ribbing and coloring can vary depending on depth of water.



Farrer's Scallop (1.5") 4 cm
Chlamys farreri (Jones and Preston, 1904). N. China, Korea and Japan. 15 to 60 m; common. Syn.: *nipponensis* Kuroda.



Scaly-ribbed Scallop (2.5") 6 cm
Chlamys scabricostata (Sowerby, 1915). Western Australia. Offshore; uncommon.



Jousseume's Scallop (1.5") 4 cm
Chlamys jousseumei (Bavay, 1904). Japan. Shallow water; uncommon.



Fine-grained Scallop (1") 2.5 cm
Chlamys asperulata (Adams & Reeve, 1850). Japan and Korea. 1 to 20 m; uncommon. Syn.: *pelseneeri* Dautzenberg & Bavay.



Golden Scallop (2") 5 cm
Bractechlamys aurantiaca (Adams & Reeve, 1850). Western Pacific; Japan. Offshore to 20 m; uncommon.



Zealandic Scallop (1.2") 3 cm
Chlamys zelandiae (Gray, 1843). New Zealand. Subtidal to 30 m; under rocks, common.



Bifrons Scallop (3") 7.5 cm
Equichlamys bifrons (Lamarck, 1819). South Australia and Tasmania. Low-tide mark to 40 m; common.



Forked Scallop (1") 2.5 cm
Chlamys dichroa (Suter, 1909). New Zealand. Offshore to 100 m; uncommon.



Little Gem Scallop (1.5") 3 cm
Chlamys gemmulata (Reeve, 1853). New Zealand. Subtidal to 30 m; common. Syn.: *radiatus* Hutton.



Delicate Scallop (3") 7.5 cm
Chlamys delicatula (Hutton, 1873). New Zealand; Antarctic. Shallow water to 30 m; common. Syn.: *subantarctica* Hedley.



Charming Scallop (2.5") 6 cm
Chlamys incantata Hertlein, 1972. Off Santa Cruz Is., Galapagos, in 200 m; rare.



Amand Scallop (1.5") 4 cm
Chlamys amandi Hertlein, 1935. Off Chile. Deep water. Syn.: *australis* Philippi; *phalara* Roth.



Irregular Scallop (1.5") 4 cm
Chlamys irregularis (Sowerby, 1842). Japan to Hawaii. Offshore 3 to 150 m; uncommon. Syn.: *cookei* D., B. & R.; *midwayensis* Habe & Okutani.



Irregular Scallop (1.5") 4 cm
Chlamys irregularis (Sowerby, 1842). This is the Hawaiian holotype of *cookei* Dall, Bartsch & Rehder, 1938.



Judd's Scallop (1") 2.5 cm
Haumea juddi Dall, Bartsch & Rehder, 1938. Hawaiian Islands. 8 to 100 m; abundant.



White-spotted Scallop (1.5") 4 cm
Chlamys luculenta (Reeve, 1853). N. Australia. Offshore; uncommon.



White-lined Scallop (1") 2.5 cm
Chlamys albolineata (Sowerby, 1887). Japan and Ryukyu Islands. Shallow water; uncommon.



Pacific Pink Scallop (2.5") 6.5 cm
Chlamys hastata hericia (Gould, 1850). Alaska to California. Offshore, 1 to 40 m; common.



Pacific Pink Scallop (2.5") 6.5 cm
Chlamys hastata hericia (Gould, 1850). Holotype specimen (7.5 cm). Rarely white (*albida* Dall).



Pacific Spear Scallop (2.5") 6 cm
Chlamys hastata hastata (Sowerby, 1843). Monterey to Newport Bay, California. Offshore; uncommon.



Freckled Scallop (1.5") 4 cm
Chlamys lentiginosa (Reeve, 1853). South Japan to S.W. Pacific. Shallow reefs; common.



Sentis Scallop (1.5") 4 cm
Chlamys sentis (Reeve, 1853). S.E. United States to Brazil. Subtidal to 4 m; common under rocks.



Ornate Scallop (1.5") 4 cm
Chlamys ornata (Lamarck, 1819). S.E. Florida to Brazil. Subtidal to 4 m; uncommon, under rocks.



Mildred's Scallop (1.5") 4 cm
Chlamys mildredae (Bayer, 1943). Believed to be a hybrid between *sentis* and *ornata*. Holotype illus.



Blistered Scallop (1.5") 4 cm
Cryptopecten vesiculosus (Dunker, 1877). Japan. Offshore, 50 to 600 m; uncommon.



Antillean Scallop (1") 2.5 cm
Lyropecten antillarum (Récluz, 1853). S.E. Florida and the West Indies. Subtidal, 2 to 30 m; uncommon.



Coral Scallop (1") 2.5 cm
Lyropecten corallinoides (Orbigny, 1834). Azores; Canary Islands and Cape Verde. Offshore from 12 to 36 m; rare.



Miraculous Scallop (1.5") 4 cm
Mirapecten mirificus (Reeve, 1853). Philippines to Hawaii. Offshore to 200 m; uncommon. Syn.: *thaanumi* D., B. & Rehder.



Pacific Lion's Paw (5") 12.5 cm
Lyropecten subnodosus (Sowerby, 1835). Gulf of California to Peru. Offshore; locally common.



Maldivian Scallop (1.8") 4.5 cm
Juxtamusium maldivense (E. A. Smith, 1903). Central Indian Ocean to the Marshall Islands. 60 to 70 m; common.



Little Boy Scallop (1.2") 3 cm
Chlamys multistriata (Poli, 1795). Norway to the Azores and Mediterranean. 2 to 2,000 m; common. Older shells distorted. Syn.: "*pusio* L."



Giant Rock Scallop (6") 15 cm
Hinnites giganteus (Gray, 1825). W. Canada to W. Mexico. Young resemble *Chlamys*. Common on subtidal rocks. Syn.: *multirugosus* Gale.



Pedum Oyster (2.5") 6 cm
Pedum spondyloideum (Gmelin, 1791). Indo-Pacific. Embedded in brain corals; uncommon. Syn.: *pedum* Röding; *spondyloides* Lamarck. Subfamily Peduminae.

KITTEN PAWS FAMILY PLICATULIDAE

This is a small family of oysterlike bivalves having a deeply sunk resilium in the hinge with a long tooth on each side. Ribs usually large and few. Only a few species are living today.



Atlantic Kitten's Paw (1") 2.5 cm
Plicatula gibbosa Lamarck, 1801. S.E. United States to Brazil. Subtidal to 20 m; abundant. Syn.: *ramosus* Lamarck.



Pacific Kitten's Paw (1") 2.5 cm
Plicatula plicata (L., 1758). Indo-Pacific. Offshore on gravel bottom, 1 to 50 m; common. Syn.: *imbricata* Menke.

THORNY OYSTERS
FAMILY SPONDYLIDAE

Although resembling oysters, the Thorny Oysters or Chrysanthemum Shells are more closely related to the scallops. The "ball-and-socket" hinge is characteristic. Marine growths on the long spines offer camouflage. Great variation in shape, colors and spines makes identification of the two dozen or more species difficult.



Regal Thorny Oyster (4") 10 cm
Spondylus regius (L., 1758). Western Pacific. On rocks, 5 to 50 m; common. Syn.: *cumingii* Sowerby.



Imperial Thorny Oyster (3") 7.5 cm
Spondylus imperialis Chenu, 1843. Japan. Offshore; 5 to 50 m; common.



Wright's Thorny Oyster (3") 7.5 cm
Spondylus wrightianus Crosse, 1872. Western Australia. Offshore to 50 m; locally common.



American Thorny Oyster (4") 10 cm
Spondylus americanus Hermann, 1781. S.E. United States to Brazil. Offshore on cliffs and wrecks from 10 to 50 m; locally common.



American Thorny Oyster (4") 10 cm
Spondylus americanus Hermann, 1781. These are cleaned specimens. In life, they are covered with sponges and algae. Syn.: *echinatus* Martyn.



Pacific Thorny Oyster (5") 13 cm
Spondylus princeps Broderip, 1833. Gulf of California to Panama. Offshore; locally common. Good specimens uncommon.



Nude Thorny Oyster (2.5") 6 cm
Spondylus anacanthus Mawe, 1823. Japan. 30 to 200 m; uncommon. Syn.: *lima* Chenu; *nudus* Sowerby.



Cat's Tongue Oyster (3.5") 9 cm
Spondylus linguae felis Sowerby, 1847. Hawaiian Is. Offshore; uncommon. Syn.: *gloriosus*, *mimus*, *kaiensis* Dall, Bartsch, and Rehder.



Many-spined Thorny Oyster (3") 7 cm
Spondylus multimuricatus Reeve, 1856. Philippines; W. Pacific. Common. In sheltered waters.



Golden Thorny Oyster (4") 10 cm
Spondylus versicolor Schreibers, 1793. W. Pacific; Japan to Philippines. Common. Syn.: *aurantius* Lamarck.



Chinese Thorny Oyster (3") 7 cm
Spondylus sinensis Schreibers, 1793. Japan to East Indies; common. Syn.: *digitatus* Perry; *petroselinus* Röding; *multilamellatus* Lamarck.



Ducal Thorny Oyster (4") 10 cm
Spondylus squamosus Schreibers, 1793. Indo-Pacific. Common. Syn.: *ducalis* Röding; *spathuliferus* Lamarck; *lamarcki* Chenu.



European Thorny Oyster (3") 7.5 cm
Spondylus gaederopus L., 1758. Mediterranean; N.W. Africa. Intertidal to 20 m; common.

JINGLE SHELLS FAMILY ANOMIIDAE

A curious group of thin, semi-translucent shells that attach to rocks, other shells and wood. The lower valve has a large, circular indentation through which protrudes the foot and byssus. The flesh has a very distasteful alumlike flavor. Most species are abundant in shallow water, a few are found in mangroves. Small windowpanes are made from *Placuna*.



American Jingle Shell (1.5") 3.5 cm
Anomia simplex (Orbigny, 1842). Eastern United States to Brazil. Shallow water; common. Black if buried in mud.



European Jingle Shell (2") 6 cm
Anomia ephippium (L., 1758). Norway to the Mediterranean and Black Sea. Intertidal to 30 m; abundant.



False Pacific Jingle (3") 7.5 cm
Monia macroschisma (Deshayes, 1839). Alaska to California; Japan. Intertidal to 70 m; common on rocks and wharf pilings.



False Zealands Jingle (3.5") 9 cm
Monia zelandica (Gray, 1843). New Zealand. Subtidal; uncommon.



False Atlantic Jingle (1") 2.5 cm
Pododesmus rudis (Broderip, 1834). S.E. United States to Brazil. Subtidal to 10 m on rocks and wrecks. Syn.: *decipiens* Philippi.



Mangrove Jingle Shell (1") 2.5 cm
Enigmonia aenigmatica (Holten, 1803). East Indies; Philippines. On mangrove roots; common. Syn.: *rosea* Gray.

TRUE OYSTERS FAMILY OSTREIDAE

The edible oysters are well known in most parts of the world and are a major source of seafood. The shell material is porcelainous, not nacreous; the pearls from edible oysters have little value. The genus *Crassostrea* has a purple muscle scar and one deep valve. *Ostrea* is white and both valves about the same. All shells are variable in shape.



Saddle Oyster (7") 17 cm
Placuna sella (Gmelin, 1791). S.W. Pacific; S.E. Asia. Subtidal; common.



Windowpane Oyster (4") 10 cm
Placuna placenta (L., 1758). Philippines; S.E. Asia. Lagoons; abundant. Used in shellcraft.



Cock's-comb Oyster (3.5") 9 cm
Lopha cristagalli (L., 1758). Indo-Pacific. Subtidal to 6 m; locally common.



Frons Oyster (2") 5 cm
Lopha frons (L., 1758). S.E. United States to Brazil. Variable in shape. On rocks or on seawhip stems; common.



Honeycomb Oyster (3") 7.5 cm
Hyotissa hyotis (L., 1758). Caribbean and Indo-Pacific. Shallow water to 30 m; uncommon.



Eastern American Oyster (3.5") 8.5 cm
Crassostrea virginica (Gmelin, 1791). Nova Scotia to Gulf of Mexico. Intertidal to 10 m; abundant. Introduced to Hawaii.



Caribbean Edible Oyster (3") 7.5 cm
Crassostrea rhizophorae (Guilding, 1828). West Indies to Brazil. Inner margin of lower valve is purplish. Abundant.



Auckland Rock Oyster (3.5") 9 cm
Crassostrea glomerata (Gould, 1850). New Zealand. Common, shallow water, edible species. Holotype illustrated.



Giant Pacific Oyster (6") 15 cm
Crassostrea gigas (Thunberg, 1793). Japan; W. Canada to California, Hawaii. Round or elongate. Common edible species.



Common European Oyster (3") 8 cm
Ostrea edulis L., 1758. W. Europe; Mediterranean. Common, commercial species.



Native Pacific Oyster (2.5") 6 cm
Ostrea lurida Carpenter, 1864. Alaska to Baja California. Alias the Olympic Oyster. Intertidal; common.



Hooded Oyster (2.5") 6 cm
Saccostrea cucullata (Born, 1778). S.W. Pacific. Shallow water; common. Syn.: *Saxostrea*.



Spiny Oyster (1") 2.5 cm
Saccostrea kegaki Torigoe and Imaba, 1981. Japan. Shallow water; common. Syn.: *spinosa* Deshayes; *echinata* of Japanese authors.

FILE CLAMS FAMILY LIMIDAE

The surface of these clams has many small prickles resembling a file. These unique bivalves have long, sticky tentacles which aid them in swimming. Most species are tropical and build nests spun from the byssus exuded by the foot. There are about 100 species, some large and living in deep water.



Spiny Lima (1.5") 4 cm
Lima lima (L., 1758). S.E. Florida to Brazil.
Under stones, 1 to 150 m; common. Syn.:
squamosa Lamarck.



Caribbean Spiny Lima (1.5") 4 cm
Lima lima form *caribaea* Orbigny, 1842.
West Indies. Spines finer. Shallow reefs;
common.



Panamanian Lima (1.3") 3 cm
Lima lima subspecies *tetrica* Gould, 1851.
W. Mexico to Ecuador. 10 to 120 m; uncommon.
Holotype illustrated.



Indo-Pacific Spiny Lima (2") 5 cm
Lima vulgaris Link, 1807. Indo-Pacific. 1 to
20 m; common. Syn.: *sowerbyi* Deshayes;
nipponica Oyama.



Few-ribbed Lima (2") 5 cm
Lima paucicostata Sowerby, 1843. Red Sea;
N.W. Indian Ocean. 1 to 20 m; uncommon.



Rough Lima (2") 5 cm
Lima scabra (Born, 1778). S.E. United States
to Brazil. Subtidal to 30 m, under rocks;
common.



Rough Lima (2") 5 cm
Lima scabra, smoothish form with very fine
ribs, *glacialis* Gmelin, 1791. Syn.: *tenera*
Sowerby (not Turton).



Basilan Lima (1.5") 3.5 cm
Limaria basilanica (Adams & Reeve, 1850).
Indo-Pacific. Shallow reefs to 20 m; com-
mon. Syn.: *orientalis* Adams & Reeve.



Fragile Lima (1") 2.5 cm
Limaria fragilis (Gmelin, 1791). Indo-Paci-
fic; Japan. Subtidal to 20 m; common.
Syn.: *kiensis* Oyama; *auaua* D., B. & R.



Inflated Lima (1.5") 3.5 cm
Limaria inflata (Gmelin, 1791). W. Europe.
Subtidal; common. Syn.: *tuberculata* Olivi.



Hians Lima (1.5") 3.5 cm
Limaria hians (Gmelin, 1791). Norway to
Mediterranean. Subtidal to 28 m; common.
Syn.: *linguata* Lamarck.



Philippine Giant Lima (8") 20 cm
Acesta philippinensis (Bartsch, 1913). Off
Luzon, Philippines, in 600 m; uncommon.
Holotype illustrated.



Rathbun's Giant Lima (6") 15 cm
Acesta rathbuni (Bartsch, 1913). Philippines; deep water; uncommon. Holotype illus. Syn.: *dalli* Bartsch, nude name.



Colombian Giant Lima (5") 12 cm
Acesta colombiana H. Vokes, 1970. S.W. Caribbean; deep water; rare. Holotype illustrated.



Diomedea Giant Lima (1.6") 4 cm
Acesta diomedae (Dall, 1908). Off Galapagos Is. In 1,400 m; rare. Holotype illustrated.



European Giant Lima (5") 10 cm
Acesta excavata (Fabricius, 1779). Norway to Azores. Offshore, 190 to 2,635 m; uncommon.

BROOCH CLAMS FAMILY TRIGONIIDAE

These deep-water, iridescent clams were widely spread in Europe and Asia during early geologic times, but are now limited to a few species found in southern Australia. It is believed that they gave rise to the fresh-water unionid mussel family. They are dredged offshore in S.E. Australia and used in jewelry.



Australian Brooch Clam (2") 5 cm
Neotrigonia margaritacea (Lamarck, 1804). Offshore to 50 m; common. Syn.: *pectinata* Lamarck; *antarctica* Péron.

LUCINA CLAMS FAMILY LUCINIDAE

A large, well-known family of usually white, hard-shelled clams in which the cardinal teeth are small, and the anterior muscle scar is narrow and long. There are no long siphons, so the clams make a tube to the surface with their foot. Many genera and species, worldwide, shallow to deep water.



Thick American Lucina (2") 5 cm
Lucina pectinata (Gmelin, 1791). S.E. United States to Brazil. Shallow water to 10 m; common. Syn.: *jamaicensis* Chemnitz.



Corrugate Lucina (2") 5 cm
Eamesiella corrugata (Deshayes, 1843). Japan to East Indies. Intertidal to 10 m; locally common.



Northeast American Lucina (2.5") 6 cm
Lucinoma filosa (Stimpson, 1851). Eastern Canada to the Gulf of Mexico. Offshore to 50 m; common. Anterior lateral tooth absent.



Heroic Lucina (3.5") 9 cm
Lucinoma heroica (Dall, 1901). Gulf of California. Very deep water; rare. Lectotype illustrated.



Pennsylvanian Lucina (2") 5 cm
Linga pensylvanica (L., 1758). S.E. United States and the West Indies. Shallow water to 2 m; common.



Florida Lucina (1.5") 4 cm
Pseudomiltha floridana (Conrad, 1833). Gulf of Mexico. Shallow water, to 20 m; common. Small deep pit in front of umbo.



Californian Lucina (1") 2.5 cm
Codakia californica (Conrad, 1837). California and Baja California. Intertidal to 100 m; common.



American Tiger Lucina (3") 7.5 cm
Codakia orbicularis (L., 1758). S.E. United States to Brazil. Subtidal to 5 m in coral sand; common.



Dwarf American Lucina (1") 2.5 cm
Ctena orbiculata (Montagu, 1808). S.E. United States to Brazil. Shell obese. Shallow water to 200 m; common.



Bella Lucina (1") 2.5 cm
Ctena bella (Conrad, 1837). Indo-Pacific; Hawaii. Intertidal to 3 m; abundant.



Interrupted Lucina (2.5") 6 cm
Codakia paytenorum (Iredale, 1937). Indo-Pacific. Intertidal to 10 m; common. Syn.: *interrupta* Reeve, not Lamarck.



Punctate Lucina (4") 10 cm
Codakia punctata (L., 1758). Indo-Pacific. Shallow sands; common. Interior pitted. Syn.: *thaanumi* Pilsbry.



Distinguished Lucina (5.5") 14 cm
Codakia distinguenda (Tryon, 1872). W. Mexico to Panama. Intertidal to 2 m; uncommon. Syn.: *colpoica* Dall; *pinchoti* Pilsbry & Lowe.



Pacific Tiger Lucina (4") 10 cm
Codakia tigerina (L., 1758). Indo-Pacific. Subtidal to 20 m; common. Syn.: *exasperata* Reeve.



Buttercup Lucina (2") 5 cm
Anodontia alba Link, 1807. S.E. United States and the West Indies. Subtidal to 1 m, near mangroves; common. Syn.: *chrysotoma* Philippi, 1847.



Chalky Buttercup Lucina (3.5") 9 cm
Anodontia philippina (Reeve, 1850). S.E. United States; Cuba; Bermuda. Uncommon. Syn.: *schrammi* Crosse.



Toothless Lucina (1.5") 3.5 cm
Anodontia edentula (L., 1758). Red Sea to Hawaii. Subtidal to 50 m; common. Syn.: *globosum* Förskal; *hawaiiensis* D., B. & Rehder.



American Cross-hatched Lucina (0.8") 2 cm
Divaricella quadrisulcata (Orbigny, 1842). S.E. United States to Brazil. Shallow water to 100 m; abundant.



Toothed Cross-hatched Lucina (1") 2.5 cm
Divaricella dentata (Wood, 1815). S.E. Florida and West Indies. Shallow water; moderately common.



Fat Cross-hatched Lucina (1") 2.5 cm
Divaricella gibba (Gray, 1825). West Africa. Offshore to 10 m; locally common.



Dall's Cross-hatched Lucina (1.5") 3.5 cm
Divaricella dalliana (Vanatta, 1901). South Africa. Shallow water; moderately common.



Cuming's Cross-hatched Lucina (1") 2.5 cm
Divaricella cumingi (Adams & Angas, 1863). South Australia. Just offshore to 400 m; common.



Children's Lucina (3") 7.5 cm
Miltha childreni (Sowerby, 1826). Eastern South America. Shallow water to 20 m; uncommon.



Common Basket Lucina (3.5") 9 cm
Fimbria fimbriata (L., 1758). Indo-Pacific. Shallow water; common. In family Fimbridae.



Sowerby's Basket Lucina (3") 7.5 cm
Fimbria sowerbii (Reeve, 1841). S.W. Pacific. 5 to 20 m; uncommon to rare.

DIPLODON CLAMS FAMILY UNGULINIDAE

A relatively obscure group of small white clams. Some build nests. Worldwide cool waters and mostly in deep water. Valves are usually globular and fat. Hinge with 2 main teeth, one of which is split. Lateral teeth absent. No pallial sinus.



Rosy Diplodon (1") 2.5 cm
Ungulina cuneata (Spengler, 1782). West Africa. In muddy sand near shore; common. Syn.: *rubra* Roissy; *oblonga* Daudin.



Rotund Diplodon (1") 2.5 cm
Diplodonta rotundata (Montagu, 1803). England to Mediterranean. Offshore, deep water; common.



Verrill's Diplodon (1") 2.5 cm
Diplodonta verrilli Dall, 1900. Off Cape Cod to North Carolina. In 30 to 140 m; uncommon. Syn.: *turgida* Verrill & Smith.



Zelandic Diplodon (0.8") 2 cm
Felaniella zelandica (Gray, 1835). New Zealand. Offshore 1 to 40 m; common.

JEWEL BOXES
FAMILY CHAMIDAE

These are neither oysters nor *Spondylus* Thorny Oysters, but a family of rock clams with crude teeth in the hinge. Usually one valve is solidly attached to the rock surface. Some species have numerous, colorful frills and spines. Most species are tropical and live in shallow water.



Lazarus Jewel Box (3") 7.5 cm
Chama lazarus L., 1758. Indo-Pacific. Rock bottoms from 1 to 20 m; moderately common.



Reflexed Jewel Box (2.5") 6 cm
Chama reflexa Reeve, 1846. Indo-Pacific. Offshore on rocks; moderately common.



Purple-edged Jewel Box (3") 7.5 cm
Chama iostoma Conrad, 1837. Indo-Pacific. Intertidal rocks to 100 m; common.



Leafy Jewel Box (2.5") 6 cm
Chama macerophylla (Gmelin, 1791). S.E. United States to Brazil. Shallow water on rocks and in clumps; common.



Corrugated Jewel Box (1") 2.5 cm
Chama congregata Conrad, 1833. S.E. United States to Brazil. Shallow water. On rocks; common.



Cherry Jewel Box (1") 2.5 cm
Chama sarda Reeve, 1847. South Florida and the Caribbean; Brazil. Offshore, 3 to 50 m; uncommon.



Smoothed-edged Jewel Box (2.5") 6 cm
Chama sinuosa Broderip, 1835. S. Florida to Brazil. Uncommon. Syn.: *firma* Pilsbry & McGinty (paratype illus.).



Clear Jewel Box (2") 5 cm
Chama arcana Bernard, 1976. Oregon to California. Intertidal to offshore; common. *C. pellucida* Broderip is from Chile.



Budd's Jewel Box (2") 5 cm
Chama buddiana C. B. Adams, 1852. Panama to Ecuador; Galapagos Is. Subtidal on rocks; common. Syn.: *rubropicta* Bartsch & Rehder.



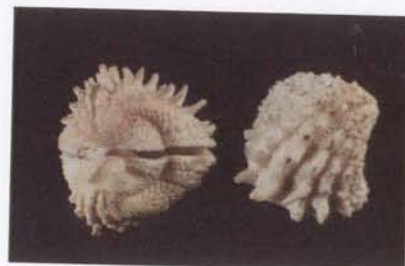
Gryphin Jewel Box (3") 7.5 cm
Pseudochama gryphina (Lamarck, 1819). N.W. Africa; Senegal. Subtidal, shallow water; moderately common.



Left-handed Jewel Box (3") 7.5 cm
Pseudochama radians (Lamarck, 1819). S.E. United States to Brazil. 1 to 80 m; common. Syn.: *ferruginea* Reeve.



Exogyra Jewel Box (3") 7.5 cm
Pseudochama exogyra (Conrad, 1837). Oregon to Panama. Intertidal; on rocks, common.



Florida Spiny Jewel Box (1.5") 4 cm
Arcinella cornuta Conrad, 1866. S.E. United States. Subtidal, 6 to 80 m; common.



True Spiny Jewel Box (2") 5 cm
Arcinella arcinella (L., 1767). West Indies to Brazil. Offshore to 80 m; locally common.

PARASITIC CLAMS SUPERFAMILY LEPTONACEA

Several hundred very small, white clams live in association with other marine organisms. The main families are the Leptonidae, Galeommatidae, and Lasaeidae. Some brood their young. Identifications are very difficult and require examination of the hinge teeth under a microscope. Two unusual examples are included here.



Deshayes's Myllita Clam (0.5") 1.2 cm
Myllita deshayesi Orbigny & Récluz, 1850. South and western Australia. Commonly washed ashore on beaches.



MacDougall's Clam (0.4") 1 cm
Ehippodonta macedougalli Tate, 1888. South Australia. Lives in mud burrows of the shrimp *Axius*. Uncommon.

CARDITA CLAMS FAMILY CARDITIDAE

The shells are heavy, with radial ribs and crenulate margins. No pallial sinus. Lunule small. Hinge with two unequal teeth in the left valve. In some, a small byssus is present. In most, the young are brooded in the mantle cavity. Many are tropical and live in shallow water.



Half-round Cardita (3") 7.5 cm
Begonia semiorbiculata (L., 1758). Tropical S.W. Pacific. Shallow reefs among rocks; locally common.



Senegal Cardita (1.5") 4 cm
Cardita senegalensis Reeve, 1843. West Africa. Intertidal to 3 m; common.



Variegate Cardita (1") 2.5 cm
Cardita variegata Bruguière, 1792. Indo-Pacific. Shallow reefs, under stones; locally common.



Similar Cardita (2") 5 cm
Carditamera affinis (Sowerby, 1833). W. Mexico to Peru. Shallow water; common. Syn.: *californica* Deshayes.



Broad-ribbed Cardita (1.2") 3 cm
Carditamera floridana Conrad, 1838. South Florida and east Mexico. Shallow water; locally abundant.



Australian Cardita (2") 5 cm
Cardita crassicosta (Lamarck, 1819). Western and South Australia. Shallow water to 100 m; common.



Thick-ribbed Cardita (2") 5 cm
Cardita crassicostata (Sowerby, 1825). W. Mexico to Peru. Intertidal to 110 m; common. Syn.: *cuvieri* Broderip.



Wide-ribbed Cardita (1.5") 4 cm
Cardita laticostata Sowerby, 1833. Gulf of California to N. Peru. Low-tide line to 55 m; common. Syn.: *tricolor* Sowerby.



Varia Cardita (2") 5 cm
Cardita varia (Broderip, 1832). Galapagos Islands. Shallow water; rare.



Ajar Cardita (1.5") 4 cm
Cardita ajar Bruguière, 1792. West Africa. Shallow water. Moderately common.



Tankerville's Cardita (2") 5 cm
Cardita tankervillei (Wood, 1828). West Africa. Offshore to 10 m; common.



Northern Cardita (1.5") 4 cm
Cyclocardia borealis (Conrad, 1831). Labrador to off North Carolina. A food for fish on the Grand Banks; abundant.



Fine-ribbed Cardita (1.5") 4 cm
Cyclocardia crebricostata (Krause, 1885). Alaska to California. Offshore, 20 to 80 m; common in Alaska. Syn.: *alaskana* Dall (holotype illus.).

ASTARTE CLAMS SUPERFAMILY CRASSATELLACEA

Consists of the families Astartidae and Crassatellidae, the former having a dark periostracum and living in cold waters. The latter family is mostly tropical and with larger, more elongate shells. The strong hinge has 2 cardinal teeth in the left valve, 3 in the right.



Waved Astarte (1.2") 3 cm
Astarte undata Gould, 1841. Labrador to off New Jersey. 10 to 208 m; common.



Lentil Astarte (1.5") 4 cm
Astarte crenata (Gray, 1824), subspecies *subequilatera* Sowerby, 1854. Arctic Seas to N.E. Florida. Deep water; common.



Sulcate Astarte (1") 2.5 cm
Astarte sulcata (da Costa, 1778). Arctic Seas (shallow water) to the Mediterranean (deep water). Common.



Chestnut Astarte (1") 2.5 cm
Astarte castanea (Say, 1822). Nova Scotia to off New Jersey. Offshore from 2 to 50 m; common.



Gibbs's Crassatella (2.5") 6 cm
Eucrassatella speciosa (A. Adams, 1852). S.E. United States and the West Indies. Shallow water; common. Syn.: *gibbesi* Tuomey & Holmes.



Antillean Crassatella (3") 7.5 cm
Eucrassatella antillarum (Reeve, 1842). Caribbean. Offshore; rare.



Digue's Crassatella (3") 7.5 cm
Eucrassatella digueti Lamy, 1917. W. Mexico to Colombia. Subtidal to 128 m; common.



King Crassatella (3") 7.5 cm
Eucrassatella kingicola (Lamarck, 1805). S.E. and S. Australia. Offshore to 50 m; common.



Deceptive Crassatella (3") 7.5 cm
Eucrassatella decipiens (Reeve, 1842). S.W. and S. Australia. Uncommon. May be a rugose form of *kingicola*.

THE COCKLES FAMILY CARDIIDAE

The cockle family is one of the largest and best-known of the bivalves. There are several hundred species, ranging from the Great Ribbed Cockle of West Africa to the Heart Cockle of the Philippines. Hinge with 2 cardinal teeth in each valve; one anterior and posterior lateral tooth in the left valve.



Great Ribbed Cockle (4") 10 cm
Cardium costatum L., 1758. West Africa as far south as Angola. 1 to 30 m; common.



Hians Cockle (3") 7.5 cm
Ringicardium hians (Brocchi, 1814). Mediterranean. Intertidal to 30 m; common.



Ringens Cockle (3") 7.5 cm
Ringicardium ringens (Bruguière, 1789). West Africa. Offshore; common.



European Spiny Cockle (3") 7.5 cm
Acanthocardia aculeata (L., 1767). Europe and West Africa. Subtidal to 30 m; moderately common.



Poorly-ribbed Cockle (2") 5 cm
Acanthocardia paucicostata (Sowerby, 1839). Mediterranean and West Africa; Black Sea. Intertidal to 290 m; common.



European Prickly Cockle (2") 5 cm
Acanthocardia echinata (L., 1758). W. Europe, N.W. Africa and Mediterranean. Shallow water; common.



Tuberculate Cockle (2.5") 6 cm
Acanthocardia tuberculata (L., 1758). England to Mediterranean; Canary Is. 15 to 100 m; common.



Sand Cockle (2.5") 6 cm
Acanthocardia spinosa (Lightfoot, 1786). Mediterranean. Subtidal to 4 m; common. Syn.: *erinaceus* Lamarck.



Magnum Cockle (3.5") 9 cm
Trachycardium magnum (L., 1758). Florida Keys to Brazil. 32 to 35 ribs. Shallow water; uncommon. Syn.: *marmoreum* Lamarck.



Yellow American Cockle (2") 5 cm
Trachycardium muricatum (L., 1758). S.E. United States to Brazil. Shallow water; common.



American Prickly Cockle (2") 5 cm
Trachycardium egmontianum (Shuttleworth, 1856). S.E. United States to east Mexico. 27 to 31 ribs. Abundant. Rarely albino.



Even Cockle (2.5") 6 cm
Trachycardium isocardia (L., 1758). West Indies; Venezuela and off east Florida. Offshore, 1 to 20 m; moderately common.



Giant Pacific Cockle (6") 15 cm
Trachycardium quadragenarium (Conrad, 1837). California to W. Mexico. Subtidal to 150 m; common.



Slender Cockle (2") 5 cm
Trachycardium procerum (Sowerby, 1833). S.W. Mexico to Chile. Shallow water. Syn.: *laticostatum* Sowerby.



Partner Cockle (2.5") 6 cm
Trachycardium consors (Sowerby, 1833). W. Mexico to Ecuador. Shallow water; common. Syn.: *hornelli* Tomlin.



Panama Thorny Cockle (1.5") 4 cm
Trachycardium senticosum (Sowerby, 1833). Gulf of California to Peru. Offshore to 80 m; common.



Reddish Cockle (2.5") 6 cm
Trachycardium rubicundum (Reeve, 1844).
Indian Ocean. Shallow water. Uncommon.



Elongate Cockle (3") 7 cm
Trachycardium elongatum (Bruguière, 1789). Indian Ocean and S.W. Pacific. Shallow waters; uncommon.



Enode Cockle (2.5") 6 cm
Trachycardium enode (Sowerby, 1841). Japan; Indo-Pacific. Shallow waters. Common.



Orbit Cockle (2.5") 6 cm
Trachycardium orbita (Sowerby, 1833). S.W. Pacific; Hawaiian Islands. Shallow reef waters; moderately common.



Orbit Cockle (2.5") 6 cm
Trachycardium orbita (Sowerby, 1833). S.W. Pacific; Hawaii. Syn.: *hawaiiensis* D., B. & Rehder (holotype illus).



Many-spined Cockle (2.5") 6 cm
Trachycardium multispinosum (Sowerby, 1841). Indo-Pacific; uncommon. Syn.: *pulchricostatum* Iredale.



Angulate Cockle (2.5") 6 cm
Trachycardium angulatum (Lamarck, 1822). Indo-Pacific. Shallow sand areas to 20 m; moderately common.



Reeve's Cockle (2.5") 6 cm
Trachycardium reeveanum (Dunker, 1852). Australia. Shallow water; uncommon.



Pacific Yellow Cockle (2.5") 6 cm
Trachycardium flavum (L., 1758). Widespread in the Indo-Pacific. Shallow water; common.



Saw-ribbed Cockle (2.5") 6 cm
Trachycardium serricostatum (Melvill & Standen, 1899). Arabia to Ceylon. Shallow water; common.



Subrugose Cockle (2.5") 6 cm
Trachycardium subrugosum (Sowerby, 1840). Indo-Pacific. Shallow water; moderately common.



Fan-shaped Cockle (2.5") 6 cm
Trachycardium pectiniforme (Born, 1778). Indian Ocean. Shallow water; common.



Burchard's Cockle (2.5") 6 cm
Trachycardium burchardi (Dunker, 1877).
Japan. Low-tide zone to 20 m; common.



Unicolor Cockle (2.5") 6 cm
Trachycardium unicolor (Sowerby, 1840).
Indo-Pacific. Shallow water. Common.



Spiny Paper Cockle (1.5") 4 cm
Papyridea soleniformis (Bruguière, 1789).
S.E. United States to Brazil. Low tide to 30
m; common.



Panama Paper Cockle (1.5") 4 cm
Papyridea aspersa (Sowerby, 1833). W.
Mexico to N. Peru. Shallow water; moder-
ately common.



Atlantic Strawberry Cockle (1.2") 3 cm
Americardia media (L., 1758). S.E. United
States to Brazil. 1 to 30 m; moderately com-
mon.



St. Helena Cockle (1") 2.5 cm
Trigoniocardia speciosa (Adams & Reeve,
1850). St. Helena Is., South Atlantic. Shal-
low water; rare.



Western Strawberry Cockle (1.5") 4 cm
Americardia biangulata (Broderip & Sowerby,
1829). S. California to Ecuador. Inter-
tidal to 170 m.



Victor Cockle (1") 2.5 cm
Ctenocardia victor (Angas, 1872). W. Paci-
fic. Offshore to 100 m; uncommon.



Pacific Strawberry Cockle (1.2") 3 cm
Fragum fragum (L., 1758). Indo-Pacific.
Shallow water; abundant.



Unedo Cockle (1.5") 4 cm
Fragum unedo (L., 1758). Indo-Pacific. Shal-
low water to 50 m; common.



Arching Strawberry Cockle (1") 2.5 cm
Fragum fornicatum (Sowerby, 1840). S.W.
Pacific; Philippines. Offshore to 30 m; un-
common.



Pacific Half Cockle (1.2") 3 cm
Lunulicardia hemicardia (L., 1758). S.W. Pa-
cific to N. Australia. Shallow water; uncom-
mon.



Tumor Cockle (1.5") 3.5 cm
Lunulicardia tumorifera (Lamarck, 1819).
Western Australia. Offshore in shallow water;
uncommon.



Guichard's Cockle (1.5") 3.5 cm
Lunulicardia guichardi (Bernardi, 1857).
New Caledonia. Shallow water; rare.



Blunted Cockle (1.5") 4 cm
Lunulicardia retusa (L., 1758). Indo-Pacific.
Shallow water to 50 m; uncommon.



Partly-blunted Cockle (1.5") 4 cm
Lunulicardia subretusa (Sowerby, 1841).
Indo-Pacific. Shallow water to 20 m; un-
common.



True Heart Cockle (2") 5 cm
Corculum cardissa (L., 1758). Indo-Pacific.
Intertidal on reefs. Locally abundant. Many
colors and shapes.



Dione Heart Cockle (0.5") 1.2 cm
Corculum dionaeum (Broderip & Sowerby,
1829). Central Pacific Islands. Shallow wa-
ter; locally common.



Asiatic Cockle (2") 5 cm
Trachycardium asiaticum (Bruguière, 1792).
Indo-Pacific. Shallow water; common in
S.W. Pacific.



Exasperating Cockle (2") 5 cm
Nemocardium exasperatum (Sowerby,
1841). Western Australia. Shallow water;
uncommon.



De la Beche's Cockle (2.5") 6 cm
Nemocardium bechei (Reeve, 1847). Japan
to Australia. Offshore from 10 to 70 m;
common. Syn.: *probatum* Iredale.



Cuming's Cockle (1") 2.5 cm
Lophocardium cumingii (Broderip, 1833).
W. Mexico to Colombia. Offshore from 22
to 26 m; rare.



Annette's Cockle (2") 5 cm
Lophocardium annettae (Dall, 1889). Gulf
of California to Costa Rica. Subtidal to 40
m; uncommon.



Lyrate Cockle (2") 5 cm
Lyrocardium lyratum (Sowerby, 1841). Ja-
pan to N. Australia. 10 to 100 m; moderately
common.



Aeolian Cockle (2") 5 cm
Lyrocardium aeolicum (Born, 1778). West Africa; Cape Verde Islands. Shallow water; rare. *Cardium pectinatum* L. is a dubious name.



Bubble Cockle (1.5") 3.5 cm
Fulvia aperta (Bruguère, 1789). Japan to the East Indies. 10 to 30 m; common. *Cardium bullatum* L. is a dubious name.



Austral Cockle (1.5") 3.5 cm
Fulvia australis (Sowerby, 1841). Japan to East Indies. 10 to 30 m; moderately common.



Japanese Cockle (1.5") 3.5 cm
Fulvia mutica (Reeve, 1844). China; Korea; Japan. 10 to 60 m; common. Syn.: *japonicum* Dunker; *annae* Pilsbry.



Rackett's Cockle (1.5") 4 cm
Laevicardium racketti (Donovan, 1825). S.E. to S.W. Australia. Shallow water; abundant.



Vanhying's Cockle (4") 10 cm
Dinocardium robustum subspecies *vanhyningi* Clench & Smith, 1944. West Florida. Shallow water; abundant.



Giant Atlantic Cockle (4") 10 cm
Dinocardium robustum (Lightfoot, 1786). Virginia to north Florida to N.E. Mexico. Shallow water; common.



Giant Pacific Cockle (7") 17 cm
Laevicardium elatum (Sowerby, 1833). S. California to Panama. Subtidal mud flats to 4 m; common.



Oblong Cockle (3") 7.5 cm
Laevicardium oblongum (Gmelin, 1791). Mediterranean to the Canary Is. 4 to 200 m; common.



Common Egg Cockle (2") 5 cm
Laevicardium laevigatum (L., 1758). S.E. United States to Brazil. Shallow water; locally common. Syn.: *vitellinum* Reeve.



Morton's Egg Cockle (1") 2.5 cm
Laevicardium mortoni (Conrad, 1830). Massachusetts to Texas. Intertidal to 4 m; common.



Ravenel's Egg Cockle (1") 2.5 cm
Laevicardium pictum (Ravenel, 1861). S.E. United States to Brazil. Offshore from 10 to 150 m; common.



Pacific Coast Egg Cockle (1") 2.5 cm
Laevicardium substriatum (Conrad, 1837).
California to Gulf of California. Intertidal to
10 m; common.



Attenuated Cockle (2") 5 cm
Laevicardium attenuatum (Sowerby, 1841).
Japan to East Indies. Shallow water; un-
common.



Two-rayed Cockle (2") 5 cm
Laevicardium biradiatum (Bruguière, 1789).
Japan to East Indies; Indian Ocean. 1-20 m,
common.



Many-dotted Cockle (2") 5 cm
Discors multipunctatum (Sowerby, 1841).
S.W. Pacific and East Indies. Shallow water;
uncommon.



Giant Philippine Cockle (6") 15 cm
Plagiocardium pseudolima (Lamarck,
1819). Philippines, East Indies. Subtidal;
common. Rarely albino.



Hairy Cockle (2") 5 cm
Plagiocardium setosum (Redfield, 1846).
S.W. Pacific; N.W. Australia. Shallow wa-
ter; common.



Common European Cockle (2") 5 cm
Cerastoderma edule (L., 1758). Norway to
N.W. Africa. Shallow water; abundant.
Many synonyms.



Exigua Cockle (1") 2.5 cm
Parvicardium exiguum (Gmelin, 1791). W.
Europe. Subtidal to 5 m; common.



Iceland Cockle (2.5") 6 cm
Clinocardium ciliatum (Fabricius, 1780).
Arctic Seas in Europe, Asia and North
America. Offshore; common.



Nuttall's Cockle (5") 12 cm
Clinocardium nuttalli (Conrad, 1837).
Bering Sea to S. California. Offshore to 30
m; common.



Bering Sea Cockle (3") 7.5 cm
Clinocardium californiense (Deshayes,
1839). Northern Japan to Alaska (not Cali-
fornia). 10 to 100 m; common. Syn.: *uchi-
dai* Habe.



Greenland Cockle (3.5") 9 cm
Serripes groenlandicus (Bruguière, 1789).
Arctic Seas in Europe, Asia, North America.
Offshore to 50 m; common.



La Perouse's Cockle (4") 10 cm
Serripes laperousii (Deshayes, 1839). Northern Japan to Alaska in 50 to 100 m; common. Syn.: *fujinensis* Yokoyama.

GIANT CLAMS FAMILY TRIDACNIDAE

Limited to the tropical waters of the Indo-Pacific, these large clams rest on the bottom with the hinge down and the gaping edge up, so that sunlight may reach the huge rolled edges of the mantle. Algal food is grown in the fleshy mantle. There are fewer than a dozen species of these giant clams, the largest reaching a weight of 500 pounds.



Giant Clam (4 ft) 1.7 m
Tridacna gigas (L., 1758). S.W. Pacific. Off-shore, near reefs 2 to 20 m; locally common.



Fluted Giant Clam (12") 30 cm
Tridacna squamosa Lamarck, 1819. Indo-Pacific, except Hawaii. Shallow reefs to 10 m; locally common.



Fluted Giant Clam (12") 30 cm
Tridacna squamosa Lamarck, 1819. Indo-Pacific. These are young specimens which may be orange, pink, yellow or white. Syn.: *imbricata* Röding.



Crocus Giant Clam (4") 10 cm
Tridacna crocea Lamarck, 1819. S.W. Pacific; S. Japan. Lives in pockets in reef flats. Common.



Elongate Giant Clam (10") 24 cm
Tridacna maxima (Röding, 1798). Entire Indo-Pacific. Shallow coral reefs; common. Syn.: *elongata* Lamarck.



Bear Paw Clam (8") 20 cm
Hippopus hippopus (L., 1758). S.W. Pacific. Shallow water coral reefs; common.



China Clam (8") 20 cm
Hippopus porcellanus Rosewater, 1982. A smooth and yellowish species found in the Sulu Sea area of the Philippines. Common.

MACTRA CLAMS FAMILY MACTRIDAE

Sometimes called the Trough or Surf Clams, this worldwide family is characterized by a strong, toothed hinge bearing a large, spoon-shaped depression, the chondrophore, into which fits a horny pad. Some species are a major source of food. There are about 100 species, most living in shallow water.



Violet Mactra (2.5") 6 cm
Mactra violacea Gmelin, 1791. Indian Ocean to Philippines. Shallow water; common.



Wedge Mactra (1.5") 4 cm
Mactra cuneata Gmelin, 1791. Indo-Pacific. Shallow water to 20 m; common.



Radiate Mactra (3") 7.5 cm
Mactra grandis Gmelin, 1791. East Indies. Shallow water; common. Syn.: *radiata* Spengler.



Agate Mactra (3") 7.5 cm
Mactra achatina Holten, 1802. Indo-Pacific. Shallow water to 50 m; common. Syn.: *ornata* Gray; *maculosa* Lamarck.



Chinese Mactra (4") 10 cm
Mactra chinensis Philippi, 1846. China; Korea; Japan. Intertidal to 20 m; common. Syn.: *sulcataria* Reeve.



Maculated Mactra (3") 7.5 cm
Mactra maculata Gmelin, 1791. Indo-Pacific. Shallow water. 1 to 30 m; common.



Antique Mactra (3") 7.5 cm
Mactra antiquata (Spengler, 1802). Indo-Pacific. Shallow water to 50 m; common. Syn.: *cornea* Reeve; *spectabilis* Lischke.



Turgid Mactra (3.5") 9 cm
Mactra turgida Gmelin, 1791. Indian Ocean. Intertidal to 10 m; common.



Ornate Mactra (2.5") 6 cm
Mactra ornata Gray, 1836. East Asia; Japan. Sand, 10 to 60 m. Common.



Pure Mactra (2") 5 cm
Mactra pura Deshayes, 1853. South Australia and Tasmania. Intertidal to 5 m; common.



Reddish Mactra (2") 5 cm
Mactra rufescens Lamarck, 1818. Western Australia and Tasmania. Low-tide area; abundant.



Discors Mactra (3.5") 9 cm
Mactra discors Gray, 1837. New Zealand. Shallow water, sand areas. Common.



Rayed Mactra (1.5") 4 cm
Mactra corallina (L., 1758). British Isles to Mediterranean. Shallow water; common. Form *stultorum* L. is rayed.



Gray Mactra (4") 10 cm
Mactra glauca Born, 1778. British Isles (rare) to Mediterranean (common). In shallow water. Syn.: *helvacea* Lamarck.



Glossy Mactra (3") 7.5 cm
Mactra glabrata L., 1767. West Africa and South Africa. Shallow water; common.



Hooked Mactra (3") 7.5 cm
Spisula falcata (Gould, 1850). Washington to California. Shallow water; moderately common.



Fragile Atlantic Mactra (2.5") 6 cm
Mactra fragilis Gmelin, 1791. S.E. United States to Brazil. Shallow water to 10 m; common.



Caribbean Winged Mactra (3.5") 9 cm
Mactrellona alata (Spengler, 1802). Caribbean to Brazil. Offshore. 1 to 20 m; locally common.



Plicate Mactra (2") 5 cm
Harvella plicataria (L., 1767). Indian Ocean. Shallow water. Rare.



Elegant Mactra (2") 5 cm
Harvella elegans (Sowerby, 1825). Gulf of California to Peru. Offshore. 28 to 80 m; moderately common.



Ripe Mactra (4") 10 cm
Mactrellona exoleta (Gray, 1837). Gulf of California to Peru. Offshore to 24 m; moderately common.



Sloping Mactra (3.5") 9 cm
Mactrellona clisia (Dall, 1915). Gulf of California to Ecuador. Offshore; uncommon.



Pallid Dwarf Mactra (2") 5 cm
Mulinia pallida (Broderip & Sowerby, 1829). W. Mexico to northern Peru. Intertidal to 25 m; common.



Atlantic Surf Clam (5") 13 cm
Spisula solidissima (Dillwyn, 1817). Nova Scotia to South Carolina. Surf line to 50 m; locally abundant. Major food. Smaller subsp. *similis* (Say, 1822), Florida to Texas.



Stimpson's Mactra (4.5") 11 cm
Spisula polynyma (Stimpson, 1860). Arctic Seas to off Rhode Island and to Puget Sound; Japan. Common.



Hemphill's Mactra (6") 15 cm
Spisula hemphilli (Dall, 1894). Central California to Baja California. Just offshore; common.



Catilliform Mactra (5") 13 cm
Spisula catilliformis (Conrad, 1867). Puget Sound to California. Offshore to 30 m; uncommon.



Spengler's Mactra (4") 10 cm
Scissodesma spengleri (L., 1767). South Africa. Common on beaches of False Bay. Syn.: *Schizodesma*.



Equal-sized Mactra (2.5") 6 cm
Spisula aequilateralis (Deshayes, 1854). New Zealand. Ocean beaches; common.



Solid Mactra (1.5") 3.5 cm
Spisula solida (L., 1758). Finland to Spain. Intertidal to 100 m; common.



Subtruncate Mactra (1") 2.5 cm
Spisula subtruncata (da Costa, 1778). Finland to the Canary Islands, Mediterranean. Common.



Rostrate Mactra (2.5") 6 cm
Mactra rostrata (Spengler, 1802). Tropical West Africa. Shallow water; common. Syn.: *cumingiana* Petit.



Glassy Mactra (2") 5 cm
Mactra nitida Gmelin, 1791. West Africa. Shallow water; common.



Snowy Mactra (4") 10 cm
Spisula nivea (Gmelin, 1791). West Africa. Shallow water; common.



Common Rangia (2") 5 cm
Rangia cuneata (Sowerby, 1831). Maryland to Texas. Estuarine bays. Low tide to 20 m; common.



Nicobar Mactra (2") 5 cm
Meropesta nicobarica (Gmelin, 1791). Indian Ocean and East Indies. Shallow water; uncommon.



Rugose Mactra (3") 7.5 cm
Eastonia rugosa (Helbling, 1779). Mediterranean to West Africa. Shallow water; common.



Snout Otter Clam (3") 7.5 cm
Lutraria rhynchaena Jonas, 1844. Western and South Australia. Shallow water; common. Syn.: *philippinarum* Reeve.



European Otter Clam (6") 15 cm
Lutraria lutraria (L., 1758). N.W. Europe to West Africa. Intertidal to 55 m; common.



Oblong Otter Clam (6") 15 cm
Lutraria magna (da Costa, 1778). Western Europe. Shallow water; common. Syn.: *oblonga* Gmelin.



Lance Mactra (4") 10 cm
Resania lanceolata Gray, 1852. New Zealand. Ocean beaches; uncommon.



Scimitar Mactra (3.5") 9 cm
Zenatia acinaces (Quoy & Gaimard, 1835). New Zealand. Ocean beaches; uncommon.



Pacific Coast Gaper (8") 20 cm
Tresus nuttalli (Conrad, 1837). Puget Sound to Baja California. Offshore to 20 m; common.



Channeled Duck Clam (2.5") 6 cm
Raeta plicatella (Lamarck, 1818). S.E. United States to Argentina. Shallow water to 6 m; common. Syn.: *canaliculata* Say.



Smooth Duck Clam (2") 5 cm
Anatina anatina (Spengler, 1802). S.E. United States to Brazil. Intertidal to 20 m; uncommon. Syn.: *lineata* Say.



Arctic Wedge Clam (1.5") 4 cm
Mesodesma arctatum (Conrad, 1830). Greenland to Maryland. Intertidal to 100 m; cold water; common. Member of the Mesodesmatidae.



Marisco Wedge Clam (3") 7.5 cm
Mesodesma mactroides Deshayes, 1854. S. Brazil to Argentina. Shallow water; common food clam.



Giant Wedge Clam (3.5") 9 cm
Mesodesma donacium (Lamarck, 1818). Peru and Chile. Intertidal sand flats; common food clam.



Subtriangular Wedge Clam (3") 7.5 cm
Paphies subtriangulata (Wood, 1828). New Zealand. Intertidal beaches; common. This genus in family Mesodesmatidae.



Pipi Wedge Clam (2.5") 6 cm
Paphies australis (Gmelin, 1791). New Zealand. Mud and sand beaches; common.



Toheroa Clam (3.5") 9 cm
Paphies ventricosa (Gray, 1843). New Zealand. Ocean beaches; locally common, edible clam.



Fat Anapella Clam (1.2") 3 cm
Anapella pinguis Crosse & Fischer, 1864. Western and South Australia; Tasmania. On sand beaches; common.



Chinese Anapella Clam (1") 2.5 cm
Caecella chinensis Deshayes, 1855. S.W. Pacific; Japan. Shallow water; common. Syn.: *zebuensis* Deshayes.



Striate Beach Clam (1") 2.5 cm
Atactodea striata (Gmelin, 1791). S.W. Pacific. Intertidal sand beaches; abundant. In family Mesodesmatidae.



Smooth Beach Clam (1") 2.5 cm
Atactodea striata (Gmelin, 1791) form *glabrata* (Gmelin, 1791). Intertidal with *A. striata*.

RAZOR AND JACKKNIFE CLAMS FAMILIES SOLENIDAE and CULTELLIDAE

A large family of burrowing, shallow-water, elongate clams with a worldwide distribution. Many are edible. The long, slender *Solen* and *Ensis* clams live in burrows in the sand of intertidal flats. The Butter Clams, *Siliqua*, are a favorite source of tender clams. Delicate shells have an internal reinforcing rib. The hinge teeth are very small cardinals.



European Razor Clam (5") 12 cm
Solen vagina L., 1758. Western Europe, Mediterranean; W. Africa. Intertidal; common. Syn.: *marginatus* Pennant (and Pulteney).



Giant Razor Clam (8") 20 cm
Ensis siliqua (L., 1758). Norway to Portugal. Intertidal; to 20 m; common. Family Cultellidae.



Green Jackknife Clam (2") 5 cm
Solen viridis Say, 1821. Rhode Island to Texas. Intertidal flats; uncommon. Single tooth at end of valve.



Oblique Jackknife Clam (6") 15 cm
Solen obliquus Spengler, 1794. West Indies to Brazil. Muddy sand; common.



Blunt Jackknife Clam (4") 10 cm
Solen sicarius Gould, 1850. W. Canada to Baja California. Intertidal flats to 50 m; common.



Rough Jackknife Clam (6") 15 cm
Solen rudis (C. B. Adams, 1852). Costa Rica to N. Peru. Intertidal; common.



Brief Jackknife Clam (3.5") 9 cm
Solen brevis Gray, in Hanley, 1842. South Asia, Indian Ocean. Mud flats; locally common.



Grand Jackknife Clam (5") 13 cm
Solen grandis Dunker, 1862. Korea to East Indies. Intertidal to 20 m; common.



Truncate Jackknife Clam (7") 17 cm
Solen truncata Wood, 1815. Indian Ocean. Sandy mud flats; common.



Gould's Jackknife Clam (4") 10 cm
Solen strictus Gould, 1861. China and Japan. Sandy mud flats; common. Syn.: *gouldi* Conrad; *corneus* Sowerby.



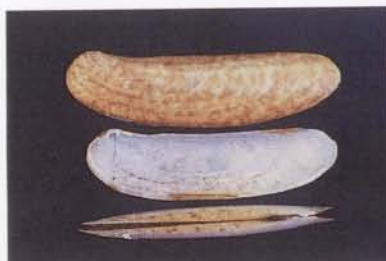
Narrow Jackknife Clam (4.3") 11 cm
Ensis ensis (L., 1758). Norway to Mediterranean. Subtidal to 80 m; common. Family Cultellidae.



Atlantic Jackknife Clam (8") 20 cm
Ensis directus Conrad, 1843. East Canada to Carolinas. Intertidal sand flats; common.



Macha Jackknife Clam (7") 17 cm
Ensis macha (Molina, 1782). S. Chile and Argentina. Sandy mud, 2 to 25 m; common.



Cultellus Clam (3") 7.5 cm
Ensisulus cultellus (L., 1758). S. Japan to the East Indies. Shallow water to 50 m; common. (Family Cultellidae).



Attenuated Phaxas (3") 7.5 cm
Phaxas attenuatus (Dunker, 1862). Japan. Offshore from 10 to 50 m; common. Syn.: *albidus* Adams & Reeve.



Sunset Siliqua (3") 7.5 cm
Siliqua radiata (L., 1758). Indian Ocean. Shallow mud areas; common. (Family Cultellidae).



Atlantic Razor Clam (2") 5 cm
Siliqua costata Say, 1822. East Canada to North Carolina. Sandy beaches, 1 to 20 m; common.



Squamate Razor Clam (3") 7.5 cm
Siliqua squama Blainville, 1824. Newfoundland to Cape Cod, Mass. Offshore; uncommon.



Pacific Razor Clam (5") 13 cm
Siliqua patula (Dixon, 1788). Alaska to California. Ocean beach flats; common edible species.



Winter's Siliqua (3") 7.5 cm
Siliqua winteriana Dunker, 1852. East Indies. Shallow muddy areas; uncommon.

TELLINS FAMILY TELLINIDAE

This is one of the colorful, popular families of thin, oval clams common in most parts of the world. The brightly colored species are mostly found in shallow tropical seas. There are many small white species very difficult to identify. The shells are usually compressed, the pallial sinus large and the cardinal teeth small.



Sunrise Tellin (3") 7.5 cm
Tellina radiata L., 1758. S.E. United States to the Caribbean. Shallow coral sand areas; common. *T. unimaculata* Lamarck is unrayed form of this species.



Elegant Tellin (4") 10 cm
Tellina chariessa Salisbury, 1934. Indo-Pacific. Shallow reef waters; rare. Syn.: *elegans* Wood.



Tonga Tellin (3") 7.5 cm
Tellina tongana Quoy & Gaimard, 1835. S.W. Pacific; S. Japan. Shallow water; uncommon.



Great Caribbean Tellin (4.5") 11 cm
Tellina magna Spengler, 1798. S.E. United States and West Indies; Bermuda. Shallow water; uncommon.



Perna Tellin (3") 7.5 cm
Tellina perna Spengler, 1798. East Africa to Hawaii. Shallow water to 20 m; uncommon.



Rostrate Tellin (3") 7.5 cm
Tellina rostrata L., 1758. S.W. Pacific. Shallow water to 20 m; uncommon. Syn.: *vulsella* Hanley, 1844.



Squalid Tellin (1.5") 4 cm
Tellina squalida Pulteney, 1799. Norway to Portugal. Sandy shores; rare.



Foliated Tellin (3") 7.5 cm
Phylloda foliacea (L., 1758). S.W. Pacific. Offshore from 5 to 20 m; locally common.



Spengler's Tellin (2") 5 cm
Tellina spengleri Gmelin, 1791. S.W. Pacific. Shallow water to 20 m; uncommon. Syn.: *rostrata* Hanley.



Smooth Tellin (3") 7.5 cm
Tellina laevigata L., 1758. S.E. United States and Caribbean. 1 to 16 m; locally common.



Speckled Tellin (2.5") 6 cm
Tellina listeri Röding, 1798. S.E. United States to Brazil; Bermuda. 1 to 100 m; common. Syn.: *interrupta* Wood.



Cuming's Tellin (2") 5 cm
Tellina cumingii Hanley, 1844. W. Mexico to Colombia. 18 to 150 m; common.



Purple Tellin (2") 5 cm
Tellina purpurea Broderip & Sowerby, 1829. Gulf of California to Colombia. Shallow water; common.



West African Tellin (3") 7.5 cm
Tellina madagascariensis Gmelin, 1791. West Africa. Shallow water; common.



Little White Tellin (2.5") 6 cm
Tellina albinella Lamarck, 1818. Southern coasts of Australia. Common.



Cross Tellin (2") 5 cm
Tellina staurella Lamarck, 1818. Indo-Pacific. Shallow water to 30 m; moderately common.



Virgate Tellin (3") 7.5 cm
Tellina virgata L., 1758. Indo-Pacific. 1 to 30 m; common. Syn.: *jubar* Hanley; *lata* Quoy and Gaimard.



Alternate Tellin (2.5") 6 cm
Tellina alternata Say, 1822. S.E. United States. Shallow water to 150 m; common.



Angulate Tellin (2") 5 cm
Tellina angulosa Gmelin, 1791. S. Florida to Uruguay. Subtidal to 8 m; fairly common.



Watermelon Tellin (2") 5 cm
Tellina punicea Born, 1778. Lower Caribbean to Brazil. Shallow water; locally common.



Rose Petal Tellin (1.5") 3.5 cm
Tellina lineata Turton, 1819. Florida to Texas to Brazil. Low-tide line to 30 m; common. Syn.: *brasiliiana* Lamarck.



Bodegas Tellin (2") 5 cm
Tellina bodegensis Hinds, 1845. W. Canada to the Gulf of California. Subtidal to 30 m; common.



Great Alaskan Tellin (3") 7.5 cm
Tellina lutea Wood, 1828. Japan to Alaska. 15 to 50 m; common. Syn.: *alternidentata* Broderip and Sowerby.



Flat Tellin (2.5") 6 cm
Tellina planata L., 1758. Mediterranean and West Africa. Intertidal; common.



Story Tellin (0.8") 2 cm
Tellina fabula Gmelin, 1791. Norway to the Black Sea. Intertidal to 14 m; common. Syn.: "*fabula* Gronovius".



Strigose Tellin (2.5") 6 cm
Tellina strigosa Gmelin, 1791. West Africa. Shallow water to 10 m; common.



Boxlike Tellin (2") 5 cm
Tellina capsoides Lamarck, 1818. Indo-Pacific. Shallow water; moderately common.



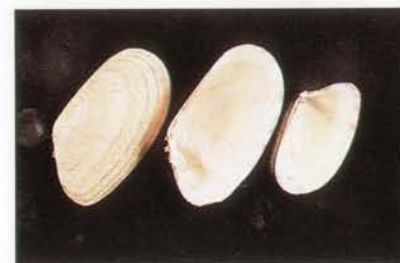
Faust Tellin (3") 7.5 cm
Tellina fausta Pulteney, 1799. S.E. United States and the Caribbean. 1 to 30 m; common.



Remies Tellin (3") 7.5 cm
Tellina remies L., 1758. Indo-Pacific. Shallow water; common.



Thick Tellin (2.5") 6 cm
Tellina crassa Pennant, 1777. Norway to Senegal, West Africa. Offshore to 150 m, common.



Donax Tellin (1") 2.5 cm
Tellina donacina L., 1758. British Isles to Mediterranean. 1 to 50 m; common.



Inflated Tellin (2.5") 6 cm
Tellina inflata Gmelin, 1791. S.W. Pacific. 1 to 10 m; common. Syn.: *striatula* Hanley.



Disk Tellin (1.5") 4 cm
Tellina disculus Deshayes, 1855. New Zealand. Subtidal beaches; common.



Palate Tellin (2") 5 cm
Tellina palatam (Iredale, 1929). Indo-Pacific. Subtidal to 20 m; common. Syn.: *rugosa* Born, not Pennant.



Rasp Tellin (2.5") 6 cm
Tellina scobinata L., 1758. Indo-Pacific. Shallow water; common. Syn.: *elizabethae* Pilsbry.



Cat's Tongue Tellin (2.5") 6 cm
Tellina linguafelis L., 1758. S.W. Pacific. Shallow water to 30 m; uncommon.



Gargadia Tellin (1") 2.5 cm
Tellina gargadia L., 1758. S.W. and Central Pacific. Shallow water; uncommon.



Fragile Tellin (1.5") 4 cm
Gastrana fragilis (L., 1758). N.W. Europe; Mediterranean; Black Sea. Intertidal flats; common.



Abildgaard's Tellin (1.2") 3 cm
Gastrana abildgaardiana (Spengler, 1798). South Africa to Mozambique. Near beaches; uncommon.



Thin Tellin (0.7") 1.8 cm
Tellina tenuis da Costa, 1778. Norway to N.W. Africa. Scarce in Mediterranean. Intertidal to 10 m; abundant.



Tampa Tellin (0.7") 1.8 cm
Tellina tampaensis Conrad, 1866. South half of Florida to Texas; West Indies. Shallow water; common.



Victoria Tellin (2") 5 cm
Tellina victoriae Gatliff & Gabriel, 1914. Southern Australia; Tasmania. Near shore; uncommon.



Large Strigilla (1") 2.5 cm
Strigilla carnaria (L., 1758). South half of Florida to Argentina. Shallow waters; locally common.



Pea Strigilla (0.2") 5 mm
Strigilla pisiformis (L., 1758). Bahamas to Brazil. Just offshore; abundant in sand.



False Red Strigilla (0.7") 1.8 cm
Strigilla pseudocarnaria Boss, 1969. Caribbean. Uncommon. Pallial sinus reaches front muscle scar.



White Crested Tellin (1.5") 4 cm
Tellidora cristata (Récluz, 1842). S.E. United States. Intertidal to 10 m; uncommon.



Atlantic Grooved Macoma (2.5") 6 cm
Psammotreta intastriata (Say, 1827). S.E. United States and Caribbean. Shallow water to 5 m; common.



Paper Grooved Macoma (3") 7.5 cm
Psammotreta papyracea (Gmelin, 1791). Mauritania to Angola, West Africa. Intertidal; common. Syn.: *lacunosa* Schröter.



Saddle Grooved Macoma (3") 7.5 cm
Psammotreta ephippium (Spengler, 1798). S.E. Asia. Shallow water; uncommon.



Plicate Grooved Macoma (3") 7.5 cm
Psammotreta plicata (Valenciennes, 1846). Indian Ocean. Shallow water; rare.



Pacific Grooved Macoma (3") 7.5 cm
Psammotreta obesa (Deshayes, 1855). California to W. Mexico. Low-tide mark to 50 m; common.



Balthic Macoma (1.2") 3 cm
Macoma balthica (L., 1758). Arctic Seas; W. Europe; N.E. United States. Shallow water; common. White or pinkish. No lateral teeth in this genus.



Chalky Macoma (2") 5 cm
Macoma calcarea (Gmelin, 1791). Arctic Seas; W. Europe; North American cold waters. Offshore; common.



Constricted Macoma (2") 5 cm
Macoma constricta (Bruguière, 1792). Florida and Texas to Brazil. Offshore to 4 m; common.



Tageluslike Macoma (2") 5 cm
Macoma tageliformis Dall, 1900. Gulf of Mexico to Brazil. Offshore to 100 m; locally common.



White Sand Macoma (4") 10 cm
Macoma secta (Conrad, 1837). W. Canada to Gulf of California. Intertidal to 50 m; common.



Bent-nose Macoma (3") 7.5 cm
Macoma nasuta (Conrad, 1837). Alaska to Baja California. Intertidal mud flats to 50 m; common.



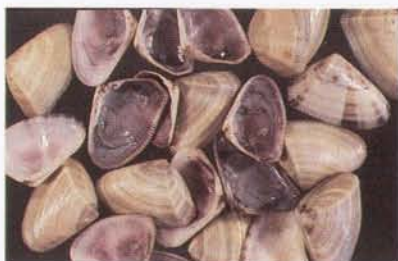
Lily Tellin (3") 7.5 cm
Tellina liliana Iredale, 1915. New Zealand. Sand beaches to offshore; common.

DONAX and BEAN CLAMS
FAMILY DONACIDAE

These small, wedge-shaped clams are found in large numbers on warm-water beaches in most parts of the world. When waves are washing the beach, the clams feed for a few seconds, and then burrow back under the sand. There are almost 60 worldwide species, many being brightly colored. A broth is made from some species.



Coquina Donax (0.6") 1.5 cm
Donax variabilis Say, 1822. New York to Texas. Sand beaches; locally and seasonally common. Syn.: *fossor* Say (New York to Virginia).



Toothed Donax (1") 2.5 cm
Donax denticulatus L., 1758. S.W. Caribbean to Brazil. Sloping beaches; locally abundant. Pinpoints on sides.



Striate Donax (1") 2.5 cm
Donax striatus L., 1767. Lower Caribbean to Brazil. Common. Posterior concave, with fine threads.



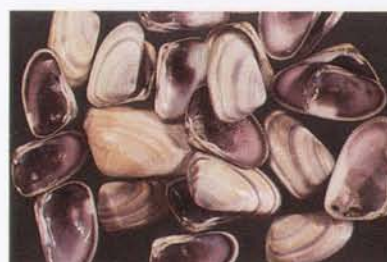
Rugose Donax (2") 5 cm
Donax rugosus L., 1758. West Africa. Abundant on beaches. Posterior with concentric rows of granulations.



Truncate Donax (1.2") 3 cm
Donax trunculus L., 1758. Portugal; Mediterranean; Black Sea. Intertidal sand beaches; common.



Banded Donax (1.2") 3 cm
Donax vittatus (da Costa, 1778). Norway to N.W. Africa; Mediterranean. Sandy bays; common.



Gould's Donax * (0.7") 1.3 cm
Donax gouldii Dall, 1921. California to Baja California. Sandy beaches; Common. Locally called the Bean Clam.



Panama Donax (1.2") 3 cm
Donax panamensis Philippi, 1849. W. Mexico to Ecuador. Sand beaches; common. Syn.: *assimilis* of authors.



Carinate Donax (1.2") 3 cm
Donax carinatus Hanley, 1843. W. Mexico to Colombia. Shallow water to 24 m; common. Syn.: *rostratus* C. B. Adams.



Townsend's Donax (1.2") 3 cm
Donax townsendi Sowerby, 1894. Persian Gulf and N.W. Indian Ocean. Sandy bays; common.



Pacific Bean Donax (0.7") 1.8 cm
Donax faba Gmelin, 1791. Indo-Pacific.
Beach slopes; locally abundant.



Cuneate Donax (1.5") 4 cm
Donax cuneatus L., 1758. Indo-Pacific.
Beach slopes; locally common.



Saw Donax (2") 5 cm
Donax serra Röding, 1798. South Africa.
Beaches; common. Syn.: *aurantiaca* Krauss.



Goolwa Donax (2") 5 cm
Plebidonax deltooides (Lamarck, 1818).
South Australia. Sandy shores; abundant.



Leather Donax (2") 5 cm
Hecuba scortum (L., 1758). East Indies; Indian Ocean. Mud bays; common. Syn.: *pubescens* L.



Giant False Donax (2.5") 6 cm
Iphigenia brasiliana (Lamarck, 1818). South half of Florida to Brazil. Shallow water to 4 m; common.



Galatea Clam (3.5") 9 cm
Galatea paradoxa (Born, 1778). Liberia to Congo, Africa. Estuaries of rivers; common.

SANGUIN and GARI CLAMS FAMILY PSAMMOBIIDAE

Known also as sunset clams this group is almost entirely associated with the warm, black muds of bays of continents and large islands. The shells are usually purple in color, with some degree of red, and the periostracum is usually dark. The pallial sinus is large. The hinge has two small cardinals but no lateral teeth.



Faeroe Gari (2.3") 6.5 cm
Gari fervensis (Gmelin, 1791). W. Europe to West Africa. Shallow water; common. Syn.: *bornii* Gmelin; *faerveensis* Chemnitz.



Depressed Gari (2") 5 cm
Gari depressa (Pennant, 1777). Norway to Mediterranean; N.W. Africa. Offshore to 50 m. Common.



Tripartite Gari (2.5") 6 cm
Gari tripartita (Deshayes, 1854). Indian Ocean to Philippines. Shallow water; uncommon.



Stanger's Gari (3") 7.5 cm
Gari stangeri (Gray, 1843). New Zealand. Sandy beaches; common.



Spotted Gari (2") 5 cm
Gari maculosa (Lamarck, 1818). Japan and China. Shallow water to 30 m; common.



Gaudy Asaphis (2.5") 6 cm
Asaphis deflorata (L., 1758). S.E. Florida to Brazil. Intertidal, near mangroves; common. Also purple.



Pacific Asaphis (2.5") 6 cm
Asaphis violascens (Förskal, 1775). Indo-Pacific; common. Syn.: *dichotoma* Anton. Coarsely ribbed.



Small False Donax (0.7") 1.8 cm
Heterodonax bimaculatus (L., 1758). Southern Florida and West Indies. Many colors. Beach slopes; locally common.



Pacific False Donax (0.8") 2 cm
Heterodonax pacificus (Conrad, 1837). Southern California to Panama. Sand beaches; common.



Atlantic Sanguin (2") 5 cm
Sanguinolaria sanguinolenta (Gmelin, 1791). Southern Florida; Texas to Brazil. Shallow water; uncommon.



Operculate Sanguin (3") 7.5 cm
Sanguinolaria cruenta (Lightfoot, 1786). Caribbean to Brazil. Shallow water; uncommon. Syn.: *operculata* Gmelin.



Tellinlike Sanguin (3") 7.5 cm
Sanguinolaria tellinoides A. Adams, 1850. Gulf of California to Ecuador. Shallow water; uncommon.



Bertin's Sanguin (3") 7.5 cm
Sanguinolaria bertini Pilsbry & Lowe, 1932. Baja California to Peru. Intertidal flats; common.



Elongate Gari (2.5") 6 cm
Psammotaea elongata (Lamarck, 1818). Indo-Pacific. Intertidal sandy mud; common. Syn.: *violacea* Lamarck.



Solid Sanguin (2.5") 6 cm
Hiatula solida (Reeve, 1857). Indian Ocean. Shallow water; uncommon. Syn.: *Soletellina*.



Diphos Sanguin (5") 12 cm
Hiatula diphos (L., 1771). Indo-Pacific. Low tide to 30 m; common. Syn.: *Soletellina violacea* Lamarck; *adamsi* Reeve.



Plane Sanguin (5") 12 cm
Hiatula planulata (Reeve, 1857). Southeast Asia. Intertidal; common.



Chinese Sanguin (5") 12 cm
Hiatula chinensis (Mörch, 1854). Color variation showing white rays. Used as food.



Boeddinghaus Sanguin (3") 7 cm
Hiatula boeddinghausi (Lischke, 1870). Japan. Intertidal flats to 50 m; common.



Glassy Sanguin (2") 5 cm
Hiatula nitida (Gray, 1843). New Zealand. Intertidal sand flats; common.



Two-rayed Sanguin (2.5") 6 cm
Hiatula biradiata (Wood, 1815). Southern Australia; Tasmania. Intertidal; common. Syn.: *nymphalis* Reeve.



California Sunset Clam (4") 10 cm
Gari californica (Conrad, 1849). Alaska to W. Mexico. Offshore to 50 m; common.



Nuttall's Mahogany Clam (5") 12 cm
Sanguinolaria nuttallii (Conrad, 1837). California to Baja California. Near estuaries in mud; common.

SOLECURTUS CLAMS FAMILY SOLECURTIDAE

Gaping at both ends, these short tubular clams are characterized by curious cross-hatch scratches on the surface. Some, like *Tagelus*, are smooth outside. Right valve with two jutting cardinal teeth; only one in left valve. Shallow water; burrow in mud. Mostly tropical.



Scraper Solecurtus (3") 7.5 cm
Solecurtus strigilatus (L., 1758). Mediterranean to western Africa. Intertidal flats; common. *S. strigillatus* is misspelling.



Pacific Solecurtus (2") 5 cm
Solecurtus pacificus Pease, 1870. Central Pacific; rare. Syn.: *S. albus* Blainville?



Divaricate Solecurtus (3") 7.5 cm
Solecurtus divaricatus (Lischke, 1869). Japan; Korea to Taiwan. Intertidal to 10 m; common.



Similar Japanese Solecurtus (2.5") 6 cm
Solecurtus consimilis Kuroda & Habe, 1961. Southern half of Japan. 10 to 50 m on sand; uncommon.



Sharp Azor Clam (2") 5 cm
Azorinus acutidens (Broderip & Sowerby, 1829). East Indies; Philippines. Shallow muddy areas; common.



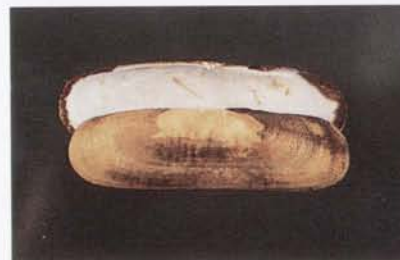
Bean Solen (3") 7.5 cm
Pharus legumen (L., 1758). Norway to Senegal and Mediterranean. Sandy bays to 80 m; common.



Purplish American Tagelus (1.5") 3.5 cm
Tagelus divisus (Spengler, 1794). Eastern United States to Brazil. Shallow sandy mud areas, 1 to 20 m; common.



Stout American Tagelus (3") 7.5 cm
Tagelus plebeius (Lightfoot, 1786). Eastern United States to Brazil. Intertidal to 5 m; common. Syn.: *gibbus* Spengler.



Californian Tagelus (3.5") 9 cm
Tagelus californianus (Conrad, 1837). Monterey, California, to W. Mexico. Intertidal sand flats; common.



Affinis Tagelus (2") 5 cm
Tagelus affinis (C. B. Adams, 1852). Southern California to Ecuador. Sand flats; common in Panama.



Dombey's Tagelus (3.5") 9 cm
Tagelus dombeii (Lamarck, 1818). W. Mexico to Peru. Subtidal to 5 m; common.



Adanson's Tagelus (2.6") 7 cm
Tagelus adansonii (Bosc, 1801). Mauritania to Angola. Estuaries; abundant. Syn.: *angulatus* Sowerby.



Constricted Tagelus (2") 5 cm
Sinovacula constricta (Lamarck, 1818). Southeastern Asia. Estuaries, mud; common.



Rugose Tagelus (2") 5 cm
Sinovacula rugosa (L., 1767). East Indies; southeastern Asia. Shallow muddy bays; common.



Greenish Tagelus (2") 5 cm
Sinovacula virens (L., 1767). Southeastern Asia; East Indies. Shallow bays in mud; common.

SEMELE CLAMS FAMILY SEMELIDAE

The colorful Semele clams are found in shallow, warm waters around the world. In addition to an external ligament, there is a chitinous resilium embedded in a diagonal groove in the hinge. Some species have a barklike periostracum, others have colorful exteriors. There are about 70 species.



Purplish American Semele (1.4") 3 cm
Semele purpurascens (Gmelin, 1791). S.E. United States to Brazil. 1 to 20 m, in sand; common. Red or purple.



Cancellate Semele (0.7") 1.8 cm
Semele bellastrata (Conrad, 1837). S.E. United States to Brazil. Shallow sandy areas; common. Syn.: *donovani* McGinty.



White Atlantic Semele (1.5") 4 cm
Semele proficua (Pulteney, 1799). S.E. United States to Brazil. Shallow sandy areas to 10 m; common. Rarely pink-rayed.



Heart-shaped Semele (2") 5 cm
Semele cordiformis (Holtén, 1803). Japan to S.E. Asia. Shallow water; moderately common. Syn.: *sinensis* Reeve.



Rough Semele (2.5") 6 cm
Semele crenulata (Sowerby, 1853). Southwestern Pacific. Shallow sandy bays; uncommon. Syn.: *scabra* Hanley, 1856.



Beautiful Semele (2") 5 cm
Semele formosa (Sowerby, 1833). Gulf of California to Ecuador. Shallow water; uncommon.



Rose Petal Semele (1.7") 4.5 cm
Semele rubropicta Dall, 1871. Alaska to Mexico. 40 to 100 m; uncommon.



Bark Semele (3") 7 cm
Semele decisa (Conrad, 1837). San Pedro, California, to W. Mexico. Pebbles and sand, 1 to 20 m; common.



Solid Semele (3.5") 8 cm
Semele solida Gray, 1828. Peru and Chile. Lower intertidal, sand. Common.



Corrugate Semele (4") 9 cm
Semele corrugata (Sowerby, 1833). Ecuador to Chile. Intertidal; abundant. Common food.



California Cumingia (1") 2.5 cm
Cumingia californica Conrad, 1837. Intertidal rock crevices, wharf pilings to 50 m; common.



Flat Furrow Clam (2.5") 6 cm
Scrobicularia plana (da Costa, 1778). Norway to Senegal. Intertidal to 2 m; common. Family Scrobiculariidae.

FALSE MUSSELS
FAMILY DREISSENIDAE

This is a strange group of bivalves related to the venerid and tellinid clam, but which have invaded freshwater and resemble the *Mytilus* blue mussels. They live attached to pilings and clog waterpipes. The narrow end of the valve has a septum or ledge.



Zebra Mussel (2") 5 cm
Dreissena polymorpha (Pallas, 1771). Europe and Asia Minor. Freshwater lakes, streams; abundant.

ARCTICA CLAMS
SUPERFAMILY ARCTICEAE

Shells resembling the venerid clams but having 2 or 3 cardinal teeth and well-developed lateral teeth. There is no pallial sinus. The genus *Arctica* is cold water, while *Trapezium* is limited to tropical waters.



Ocean Quahog (4") 10 cm
Arctica islandica (L., 1767). Newfoundland to off North Carolina. Dredged from 10 to 160 m; abundant. Commercial food clam.



Carinate Trapezium Clam (2") 5 cm
Trapezium bicarinatum (Schumacher, 1817). Indo-Pacific. Shallow reef sands; common. Syn.: *angulatum* Lamarck.



Oblong Trapezium Clam (2.5") 6 cm
Trapezium oblongum (L., 1758). Indo-Pacific. Shallow water reefs; common. Family Trapezidae.

HEART CLAMS
FAMILY GLOSSIDAE

This curious family of bivalves has a coiled umbo which gives the clam a swollen heart shape. It is an ancient group which is survived by only a few species including the well-known Oxheart Clam of Europe. A few species are found in the tropics. Formerly known as the Isocardiidae.



Oxheart Clam (3.5") 9 cm
Glossus humanus (L., 1758). Norway to the Mediterranean. Offshore 8 to 3,000 m; common. Syn.: *Isocardia cor* L.



Oxheart Clam (3.5") 9 cm
Glossus humanus (L., 1758). European Seas. A popular shell that is also used as food. Another view.



Moltke's Heart Clam (1.5") 3.5 cm
Meiocardia moltkiana (Spengler, 1783). East Indies; Philippines. Shallow water; uncommon. Syn.: *moltkiana* Gmelin.

CALYPTO CLAMS
FAMILY VESICOMYIDAE

This is an obscure, mainly deepsea, family of clams. They are seldom seen in amateur collections. There are only three living genera, the largest being the Calypto Clams. One giant species has been recently found in deepsea rifts off the Galapagos Islands.



Magnificent Calypto Clam (7") 18 cm
Calyptogena magnifica Boss & Turner, 1980. Off Galapagos, near deepsea hot springs; locally common. Holotype illustrated.

CORBICULA CLAMS FAMILY CORBICULIDAE

This small family of clams lives in freshwater and estuaries. Most have a purplish shell and a thick glossy or hairy periostracum. The Asian Clam was introduced to United States rivers in 1938 and has become a nuisance throughout the country.



Asian Clam (1.3") 3 cm
Corbicula fluminea (Müller, 1774). Asia; East Indies; United States. Rivers and lakes; abundant. Syn.: *manilensis* Philippi.



Violet Batissa Clam (3") 7.5 cm
Batissa violacea (Lamarck, 1806). Philippines and Indonesia. Freshwater ponds; common.



Strong Batissa Clam (3") 7.5 cm
Batissa fortis Prime, 1860. New Guinea and Solomon Islands. Rivers; locally common.



Common Geloina (2.5") 6 cm
Geloina coaxans (Gmelin, 1791). Japan to the East Indies. Estuaries and ponds; common.



Florida Marsh Clam (1") 2.5 cm
Polymesoda maritima (Orbigny, 1842). Florida to Texas. Brackish warm water. Syn.: *floridana* Conrad.



Carolina March Clam (1.5") 4 cm
Polymesoda caroliniana (Bosc, 1801). Virginia to Texas. Tidal estuaries in freshwater. In sand; common.



Agreeable Marsh Clam (1.5") 4 cm
Polymesoda placans (Hanley, 1845). Central America. Freshwater rivers near the sea; locally abundant.

VENUS CLAMS FAMILY VENERIDAE

A large and well-known family of hard-shelled clams found in most parts of the world. In cold seas many species, such as the Quahog or hard-shell clam, are used for food. In warmer waters the species are more colorful. There are numerous genera and hundreds of species.



Warty Venus (2.5") 6 cm
Venus verrucosa (L., 1758). Southern British Isles to Mediterranean. Intertidal to 12 m. Common edible species.



Chamber Venus (1.5") 3.5 cm
Circomphalus casinus (L., 1758). Norway to Senegal; Mediterranean. Intertidal sand; common. Syn.: *discinus* Lamarck.



Chicken Venus (1.5") 4 cm
Chamelea gallina (L., 1758). Mediterranean. Intertidal sand flats; common.



Embossed Venus (2.5") 6 cm
Venus toreuma Gould, 1851. Indo-Pacific.
Shallow sandy areas; uncommon.



Lamellate Venus (2") 5 cm
Antigona lamellaris Schumacher, 1817.
Indo-Pacific. Coral sand, shore to 20 m;
uncommon. Syn.: *lamarkii* Gray.



Lamellate Venus (2") 5 cm
Antigona lamellaris Schumacher, 1817.
Some specimens have a rosy interior and a
more colorful exterior.



Ford's Venus (2") 5 cm
Circomphalus fordii (Yates, 1890). Southern
California. Shallow water; uncommon.



Empress Venus (1.5") 3.5 cm
Circomphalus strigillinus (Dall, 1902).
Southeastern United States. Offshore to
200 m; uncommon.



Rigid Venus (3") 7 cm
Ventricolaria rigida (Dillwyn, 1817). Florida
Keys (rare) to West Indies (common) and
Brazil.



Even-heart Venus (2.5") 6 cm
Ventricolaria rigida subspecies *isocardia*
(Verrill, 1870). W. Mexico to Ecuador. Com-
mon.



Youthful Venus (3.5") 9 cm
Periglypta puerpera (L., 1771). Indo-Pacific.
Shallow water to 20 m; locally common.



Reticulate Venus (3.5") 9 cm
Periglypta reticulata (L., 1758). Indo-Pacific.
Shallow water to 20 m; locally common.
Syn.: *edmondsoni* D., B. & R.



Crispate Venus (3") 7.5 cm
Periglypta crispata (Deshayes, 1854). Indo-
Pacific. Shallow water; uncommon.



Clathrate Venus (3") 7.5 cm
Periglypta clathrata (Deshayes, 1853). Indo-
Pacific. Shallow water; uncommon.



Chemnitz's Venus (3.5") 9 cm
Periglypta chemnitzii (Hanley, 1844). South-
western Pacific. 1 to 20 m; common. Syn.:
fischeri Récluz.



Scaly-ridged Venus (4") 10 cm
Circomphalus foliaceolamellosus (Dillwyn, 1817). Western Africa. Shallow water; common.



Script Venus (1.5") 4 cm
Circe scripta (L., 1758). Indo-Pacific. 1 to 20 m; locally common. Syn.: *personata* Deshayes.



Rivula Venus (1.5") 4 cm
Circe rivularis (Born, 1778). Western Australia. Shallow water; common.



Freckled Venus (1.5") 4 cm
Circe lentiginosa (Mörch, 1853). Indian Ocean. Shallow water; uncommon.



Corrugate Venus (1.5") 4 cm
Circe corrugata (Deshayes, 1853). Red Sea. Shallow water; moderately common.



Crocus Venus (2") 5 cm
Circe crocea (Hanley, 1843). Red Sea. Sandy bays; locally common.



Pretty-backed Venus (2") 5 cm
Circe callipyga (Born, 1778). Indian Ocean. Sandy bays; locally common.



Forked Venus (1.5") 3.5 cm
Gafrarium divaricatum (Gmelin, 1791). Indo-Pacific. Shallow sandy areas; common. Syn.: *aequivoca* Sowerby.



Tumid Venus (1.5") 3.5 cm
Gafrarium tumidum Röding, 1798. Indo-Pacific. Shallow water to 20 m; common. Syn.: *gibbia* Lamarck.



Pectinate Venus (1.5") 3.5 cm
Gafrarium pectinatum (L., 1758). Indo-Pacific. Shallow sandy areas to 20 m; common.



Mauve Sunetta (2") 5 cm
Sunetta menstrualis (Menke, 1843). Eastern Asia; Australia. Uncommon. Syn.: *excavata* Hanley; *magnifica* Reeve.



Fossate Sunetta (1.5") 4 cm
Sunetta effossa (Reeve, 1843). Northwestern Indian Ocean. Shallow water; locally common.



Pure Sunetta (3") 7 cm
Sunetta meroe (L., 1758). Southeastern Asia and Indian Ocean. Shallow water; common.



Truncate Sunetta (1.5") 4 cm
Sunetta truncata (Deshayes, 1853). Indian Ocean and southeastern Asia. Shallow water; common.



Cleft Sunetta (1.5") 4 cm
Sunetta vaginalis (Menke, 1843). Western Australia. Shallow water; uncommon.



Solander's Sunetta (1.5") 4 cm
Sunettina solanderii (Gray, 1825). Indian Ocean and southeastern Asia; Japan. 10 to 50 m; uncommon.



Karachi Sunetta (2") 5 cm
Sunetta kurachensis Sowerby, 1895. North-western Indian Ocean. Shallow water. Locally common.



Poker-chip Venus (3") 7 cm
Meretrix lusoria (Röding, 1798). Eastern Asia. Shallow water to 20 m; abundant.



Triple Tivela (1.5") 4 cm
Tivela tripla (L., 1777). Western Africa. Shallow water; moderately common.



Ponderous Tivela (3") 7.5 cm
Tivela ponderosa (Philippi, 1844). North-western Indian Ocean. Shallow water; locally common. Non Schumacher, 1817.



Flattened Tivela (2") 5 cm
Tivela planulata (Broderip & Sowerby, 1830). W. Mexico to Ecuador. Shallow sandy areas; common.



Byron Tivela (2") 5 cm
Tivela byronensis (Gray, 1838). W. Mexico to Ecuador. Intertidal beaches to 73 m; common. Syn.: *radiata* Sowerby.



Trigonal Tivela (1.2") 3 cm
Tivela mactroides (Born, 1778). West Indies to Brazil. Shallow water; common.



Ventricose Tivela (3") 7.5 cm
Tivela ventricosa (Gray, 1838). Brazil and Uruguay. Shallow sandy areas; common.



Pismo Clam (5") 12 cm
Tivela stultorum (Mawe, 1823). California and Baja California. Sandy intertidal flats; common edible species.



Tumid Pitar Venus (1.5") 4 cm
Pitar tumens (Gmelin, 1791). Canaries; western Africa. Intertidal sands; locally common.



White Pitar Venus (1.5") 4 cm
Pitar albidus (Gmelin, 1791). West Indies to Brazil. Shallow water; common.



Prow Pitar Venus (1.5") 4 cm
Pitar prora (Conrad, 1837). Southwestern Pacific. Shallow water; common.



Yellow Pitar Venus (2") 5 cm
Pitar citrinus (Lamarck, 1818). Indo-Pacific. Shallow water; common.



Japanese Pitar Venus (1.5") 4 cm
Pitar japonicus Kuroda & Kawamoto, 1956. Offshore, 10 to 50 m; uncommon.



Concise Pitar Venus (2") 5 cm
Pitar concinnus (Sowerby, 1835). W. Mexico to Peru. Intertidal to 73 m; common.



Lightning Venus (1.5") 4 cm
Pitar fulminatus (Menke, 1828). S.E. United States to Brazil. Shallow water; common.



Schwengel's Venus (1.5") 4 cm
Pitar cordatus (Schwengel, 1951). Gulf of Mexico to Brazil. Offshore, 60 to 100 m; locally common.



Simpson's Venus (0.7") 1.8 cm
Pitar simpsoni (Dall, 1889). Southern half of Florida and the West Indies. 1 to 40 m; locally common.



Morrhua Venus (1.5") 4 cm
Pitar morrhuanus (Linsley, 1848). Eastern Canada to off North Carolina. 1 to 50 m; common.



Rough Pitar Venus (1") 2.5 cm
Pitar rudis (Poli, 1795). Mediterranean to Senegal. Shallow water to 500 m; common.



Wounded Pitar Venus (1.7") 4.5 cm
Pitar vulneratus (Broderip, 1835). W. Mexico to Panama. Intertidal to 15 m; common.



Unicolor Pitar Venus (1.7") 4.5 cm
Pitar unicolor (Sowerby, 1835). W. Mexico to Ecuador. Offshore to 11 m; common.



Curled Pitar Venus (2") 5 cm
Pitar circinatus (Born, 1778). West Indies to Brazil. Shallow water; common. Subspecies *alternatus* (Broderip, 1835) from Panama is similar.



Rosy Pitar Venus (1.5") 3.5 cm
Pitar roseus (Broderip & Sowerby, 1829). W. Mexico to Panama. Shallow water to 73 m; common.



Royal Comb Venus (1.5") 4 cm
Pitar dione (L., 1758). West Indies. Subtidal beaches; locally common.



Prostitute Venus (2") 5 cm
Pitar lupanaria (Lesson, 1830). W. Mexico to Peru. Intertidal beaches to 3 m; common.



Purple Amiantis (3.2") 8 cm
Amiantis purpurata (Lamarck, 1818). Brazil to Argentina. Intertidal to 2 m; common.



Beauty Amiantis (4") 10 cm
Amiantis callosa (Conrad, 1837). California to W. Mexico. Subtidal to 4 m; common.



Reddish Callista (3") 7.5 cm
Callista erycina (L., 1758). Southwestern Pacific to Japan. 1 to 20 m; moderately common. Syn.: *spuma* Röding.



Lilac Callista (4") 10 cm
Callista erycina form *lilacina* (Lamarck, 1818). Western Australia. Shallow water; common.



Bardwell's Callista (3") 7.5 cm
Callista bardwelli Clench & McLean, 1936. Western Australia. Shallow water; uncommon. Holotype illus.



Planatella Callista (3") 7.5 cm
Paradione planatella (Lamarck, 1818). Indian Ocean. Uncommon. Syn.: *costata* Chemnitz; *nioba* Clench & McLean (holotype illus.).



Grata Callista (3") 7.5 cm
Callista grata (Deshayes, 1853). East Indies; northern Australia. Shallow sands; uncommon. Syn.: *pectoralis* Sowerby (not Lamarck).



King's Callista (2") 5 cm
Paradione kingi (Gray, 1827). Eastern and southern Australia. Intertidal to 5 m; common.



Unequal Callista (2") 5 cm
Callista impar (Lamarck, 1818). Indian Ocean and southwestern Pacific. Shallow, sand areas; common.



Flower Callista (2") 5 cm
Callista florida (Lamarck, 1818). Indian Ocean. Shallow sandy bays; locally common.



China Callista (2.5") 6 cm
Callista chinensis (Holten, 1803). Southwestern Pacific. 2 to 50 m; common. Syn.: *sinensis* Sowerby.



Festive Callista (2.5") 6 cm
Callista chinensis form *festiva* Reeve, 1864. Southwestern Pacific. Smoother form. Common.



Short-snouted Callista (3") 7.5 cm
Callista brevisiphonata (Carpenter, 1865). Japan. 1 to 30 m; locally common. Syn.: *chishimana* Pilsbry.



Umbo Callista (3") 7.5 cm
Callista umbonella (Lamarck, 1818). Red Sea and Persian Gulf. Shallow water; common.



Snowy Callista (2.5") 6 cm
Callista umbonella form *nivea* (Hanley, 1843). Persian Gulf. A white form. Locally common.



Smooth Callista (3") 7.5 cm
Callista chione (L., 1758). English Channel to Mediterranean. 8 to 100 m; common.



Glory-of-the-Seas Venus (1.5") 4 cm
Callista eucymata (Dall, 1890). S.E. Florida to Brazil. Offshore 30 to 200 m; uncommon.



Many-rayed Callista (3") 7.5 cm
Callista multiradiata (Sowerby, 1851). Western Indian Ocean. Shallow water; uncommon.



Sunray Venus (5") 12 cm
Macrocallista nimbosa (Lightfoot, 1786). S.E. United States to Texas. 1 to 30 m; locally abundant.



Calico Clam (2") 5 cm
Macrocallista maculata (L., 1758). S.E. United States to Brazil. 1 to 20 m; locally abundant. Rarely albino.



Golden Callista (4") 10 cm
Megapitaria aurantiaca (Sowerby, 1831). W. Mexico to Ecuador. Tidal flats to 10 m; common. Syn.: *aurantia* Sowerby.



Squalid Callista (4") 10 cm
Megapitaria squalida (Sowerby, 1835). W. Mexico to Peru. Sandy mud flats; abundant.



Texas Venus (3") 7.5 cm
Agriopoma texasiana (Dall, 1892). N.W. Florida to northeastern Mexico. 8 to 25 m; moderately common.



Camp Pitar Venus (1.5") 3.5 cm
Lioconcha castrensis (L., 1758). Indo-Pacific. Shallow sand flats; common.



Hieroglyphic Venus (1.5") 3.5 cm
Lioconcha hieroglyphica (Conrad, 1837). S.W. and central Pacific. Coral sands; common.



Ornate Pitar Venus (1") 2.5 cm
Lioconcha ornata (Lamarck, 1817). Indo-Pacific. Sandy coral areas; common. Syn.: *picta* Lamarck.



Lorenz's Pitar Venus (2") 5 cm
Lioconcha lorenziana (Dillwyn, 1817). S.W. Pacific. Muddy sand flats to 20 m; uncommon. Syn.: *hebraea* Sowerby; *sowerbyi* Deshayes.



Smooth Washington Clam (4") 10 cm
Saxidomus gigantea (Deshayes, 1839). Alaska to California. Common, edible Alaskan seafood.



Common Washington Clam (4") 10 cm
Saxidomus nuttalli (Conrad, 1837). California to Baja California. "Butter Clam" is common, edible, intertidal species.



Purple Washington Clam (4") 10 cm
Saxidomus nuttalli subspecies *purpuratus* (Sowerby, 1852). Japan. Intertidal to 20 m; common.



Tierra del Fuego Venus (3.5") 9 cm
Humilaria exalbida (Dillwyn, 1817). Brazil to Argentina. 25 to 70 m; uncommon.



Kennerley's Venus (3.5") 9 cm
Humilaria kennerleyi (Reeve, 1863). Alaska to California. 6 to 40 m; locally common.



Samarangia Clam (2") 5 cm
Samarangia quadrangularis (Adams & Reeve, 1850). Western Pacific. 10 to 30 m; rare. Shell yellow, smooth under sand coating.



Disk Dosinia (3") 7.5 cm
Dosinia discus (Reeve, 1850). S.E. United States and Bahamas. Shallow sand bars; common. 50 ridges per inch.



Elegant Dosinia (3") 7.5 cm
Dosinia elegans Conrad, 1846. S.E. United States; Caribbean. Shallow water; common. 22 ridges per inch.



Concentric Dosinia (3") 7.5 cm
Dosinia concentrica (Born, 1778). Cuba and Mexico to Brazil. Shallow water; common. Syn.: *dosin* Adanson.



Mature Dosinia (2") 5 cm
Dosinia exoleta (L., 1758). Norway to western Africa; Mediterranean. Intertidal to 20 m; common. Syn.: *radiata* Reeve.



Heart Dosinia (1.5") 3.5 cm
Dosinia isocardia (Dunker, 1843). Western Africa. Shallow water; common.



Chinese Dosinia (3") 7.5 cm
Dosinia sinensis (Gmelin, 1791). China; southwestern Pacific. Shallow sandy areas to 10 m; common.



Histro Dosinia (2.5") 6 cm
Dosinia histrio (Gmelin, 1791). Southwestern Pacific to Japan. Shallow water to 30 m; common.



Red Sea Dosinia (2.5") 6 cm
Dosinia erythraea Romer, 1860. Northwestern Indian Ocean. Shallow water; common.



Lunate Dosinia (3.5") 9 cm
Dosinia bilunulata (Gray, 1838). Japan. Subtidal to 50 m; locally common.



Japanese Dosinia (2.5") 6 cm
Dosinia japonica (Reeve, 1850). Japan. Shallow water to 50 m; common.



Troschel's Dosinia (3") 7.5 cm
Dosinia troscheli (Lischke, 1873). Japan. 10 to 30 m; common.



Scaled Dosinia (2.5") 6 cm
Dosinia scalaris (Menke, 1843). Western and southern Australia. Shallow water; common.



Juvenile Dosinia (2") 5 cm
Dosinia juvenilis (Gmelin, 1791). Philippines and southwestern Pacific. Shallow water; common. Syn.: *juvenis* Dillwyn.



Variegated Dosinia (2") 5 cm
Dosinia variegata (Gray, 1838). Indian Ocean. Shallow water; uncommon.



Bluish Dosinia (2.5") 6 cm
Dosinia caerulea (Reeve, 1850). Japan. 10 to 30 m; common.



Victoria Dosinia (2.5") 6 cm
Dosinia victoriae Gatliff & Gabriel, 1914. Victoria and South Australia. Beaches to 80 m; common.



Maori Dosinia (2") 5 cm
Dosinia maoriana Oliver, 1923. New Zealand. Shallow water; uncommon.



Subrosa Dosinia (2") 5 cm
Dosinia subrosea (Gray, 1835). New Zealand. Common on beaches to 3 m.



Subrosa Dosinia (2") 5 cm
Dosinia subrosea (Gray, 1835). New Zealand. Some specimens are white, others pinkish rose. Common.



Old Woman Dosinia (3") 7 cm
Dosinia anus (Philippi, 1848). New Zealand. Intertidal sand flats to 3 m; common.



Anna's Dosinia (2") 5 cm
Dosinia semiobliterata Deshayes, 1853. Gulf of California to Panama. Syn.: *annae* Carpenter.



Ponderous Dosinia (6") 15 cm
Dosinia ponderosa (Gray, 1838). W. Mexico to northern Peru. 3 to 60 m; moderately common.



Dunker's Dosinia (2") 5 cm
Dosinia dunkeri (Philippi, 1844). W. Mexico to northern Peru. Intertidal to 55 m; common.



Zealandic Dosinula (2.5") 6 cm
Dosinia zelandica Gray, 1835. New Zealand. Mud flats and rubble; common. (Not a *Dosinia*.)



Atlantic Cyclinella (1") 2.5 cm
Cyclinella tenuis (Récluz, 1852). Virginia to Texas to Brazil. 1 to 100 m; common.



Singley's Cyclinella (1.5") 3.5 cm
Cyclinella singleyi Dall, 1902. W. Mexico to Panama. Subtidal in estuaries; common.



Amethyst Gem Clam (0.2") 5 mm
Gemma gemma (Totten, 1834). Eastern Canada to Texas; introduced to Puget Sound, Washington. Common.



Brown Gem Clam (0.2") 5 mm
Parastarte triquetra (Conrad, 1846). Florida to Texas. Intertidal sand bars; common.



Milky Pacific Venus (2") 5 cm
Compsomyx subdiaphana (Carpenter, 1864). Alaska to Gulf of California. In mud, 10 to 50 m; common.



Lettered Venus (3.5") 9 cm
Tapes literatus (L., 1758). Indo-Pacific. Shallow water; locally common. Syn.: *radiata* Gmelin; *punctata* Gmelin. *T. litterata* is misspelling.



Spotted Venus (3.5") 9 cm
Tapes literatus form *guttulatus* Röding, 1798. Indo-Pacific; common. Syn.: *adspersa* Lamarck, 1818.



Turgid Venus (3") 7.5 cm
Tapes dorsatus (Lamarck, 1818). Southwestern Pacific. Shallow water; common. Syn.: *turgida* and *ovulaea* Lamarck.



Arakan Venus (1") 2.5 cm
Timoclea arakana (G. & H. Nevill, 1871). South Africa to Ceylon. Uncommon. Syn.: *arakensis* E. A. Smith; *malonei* Vanatta.



European Aurora Venus (1.5") 4 cm
Venerupis aurea (Gmelin, 1791). Norway to Mediterranean and Black Sea. Intertidal; abundant. Syn.: *texturata* Lamarck.



Variegate Venus (1.5") 4 cm
Ruditapes variegatus (Sowerby, 1852). Indo-Pacific. Intertidal; abundant. Syn.: *punicea* and *cinerea* Deshayes.



Rooster Venus (2.5") 6 cm
Paphia gallus (Gmelin, 1791). Indian Ocean to Australia. Intertidal; common. Syn.: *malabarica* "Chemnitz"; *sinuosa* Lamarck.



Rooster Venus (2.5") 6 cm
Paphia gallus form *lentiginosa* (Reeve, 1864). Indian Ocean. Some specimens are spotted.



Fertile Venus (2.5") 6.5 cm
Marcia opima (Gmelin, 1791). Eastern Africa to the East Indies. Intertidal; common. Syn.: *triradiata* Gmelin; *pinguis* Hanley.



Cor Venus (3") 7.5 cm
Paphia cor (Sowerby, 1853). Northern Indian Ocean; Persian Gulf. Shallow water; locally common.



Japan Venus (2.5") 6 cm
Marcia japonica (Gmelin, 1791). Indo-Pacific. Common. Syn.: *striata* Gmelin; *tristis* and *elegantina* Lamarck; *aurisiaca* Wood.



Hiant Venus (2.5") 6 cm
Marcia hiantina (Lamarck, 1818). Eastern Africa to Australia. Common. Syn.: *rimularis* and *flammiculata* Lamarck; *luzonica* Sowerby.



Scalarina Venus (1.5") 4 cm
Katelysia scalarina (Lamarck, 1818). Southern Australia and Tasmania. Intertidal; common food. Syn.: *polita* Nielsen, 1964.



Aphrodina Venus (1.5") 4 cm
Katelysia scalarina form *aphrodina* (Lamarck, 1818). Southern Australia. Sculpture is very variable in this species.



Strigose Venus (1.5") 4 cm
Katelysia scalarina form *strigosa* (Lamarck, 1818). Some specimens are more elongate than others. Southern Australia.



Smoky Venus (1.5") 4 cm
Eumarcia fumigata (Sowerby, 1853). Southern Australia; Tasmania. Intertidal mud flats; abundant.



Butterfly Venus (3") 7.5 cm
Paphia alapapilionis Röding, 1798. Indian Ocean. Common. Syn.: *papilionacea* Lamarck; *rotundata* Gmelin (not Linné).



Lovely Venus (3") 7.5 cm
Paphia amabilis (Philippi, 1847). Japan and China. 10 to 70 m; uncommon.



Lovely Venus (3") 7.5 cm
Paphia amabilis (Philippi, 1847). Japan and China. Some specimens lack the spottings.



Sulcose Venus (3") 7.5 cm
Paphia crassiusulca (Lamarck, 1818). Indian Ocean. Shallow water; uncommon. Syn.: *sulcosa* Philippi; *meroaeformis* Sowerby.



Varnished Venus (3") 7.5 cm
Paphia vernicosa (Gould, 1861). Japan and China. Offshore to 50 m; uncommon. Syn.: *graeffei* Dunker.



Equilateral Venus (3") 7.5 cm
Gomphina aequilatera (Sowerby, 1825). Eastern Asia; Japan. Common. Syn.: *mela-naegis* Romer; *veneriformis* Lamarck of authors.



Undulating Venus (3") 7.5 cm
Paphia undulata (Born, 1778). Red Sea to Australia and Japan. Common. Syn.: *scor-dalus* Iredale.



Textile Venus (3") 7.5 cm
Paphia textile (Gmelin, 1791). Eastern Africa to S.W. Pacific; Japan. Shallow mudflats. Syn.: *textrix* Chemnitz.



Well-carved Venus (3") 7.5 cm
Paphia euglypta (Philippi, 1847). Japan. 10 to 40 m; common. Syn.: *lischkei* Fischer & Metivier, 1971?



Dura Venus (2.5") 6 cm
Venerupis dura (Gmelin, 1791). Morocco to Angola. Intertidal; common. Syn.: *rariflamma* Lamarck.



Corrugate Venus (1.5") 3.5 cm
Venerupis corrugata (Gmelin, 1791). Western Africa to Natal, South Africa. Intertidal; common. Syn.: *dactyloides* Sowerby.



Pullet Venus (1.5") 3.5 cm
Venerupis corrugata subspecies *pullastra* (Montagu, 1803). Norway to N.W. Africa. Intertidal; common. Syn.: *senegalensis* Gmelin.



Decussate Venus (2") 5 cm
Venerupis decussata (L., 1758). British Isles to Mediterranean. Intertidal; common. Syn.: *reticulata* da Costa.



Filipino Venus (2") 5 cm
Ruditapes philippinarum (Adams & Reeve, 1850). S.E. Asia; introduced to Hawaii and Pacific United States. Intertidal; abundant.



Filipino Venus (2") 5 cm
Ruditapes philippinarum (Adams & Reeve, 1850). Many color variations. Syn.: *indica* Sowerby; *violascens* Deshayes; *semidecussata* Reeve.



Milky Venus (1.5") 4 cm
Venerupis galactites (Lamarck, 1818). Southern half of Australia. Intertidal; common.



Gray Venus (1.5") 4 cm
Irus griseus (Lamarck, 1818). Southern Australia and Tasmania. Offshore; uncommon. Syn.: *diemenensis* Quoy & Gaimard.



Reflexed Venus (1") 2.5 cm
Irus reflexus (Gray, 1843). New Zealand. Rock crevices at low-tide zone; common. Syn.: *siliqua* Deshayes.



Elegant Venus (1.5") 3.5 cm
Irus elegans (Deshayes, 1853). New Zealand. In soft rocks at low-tide zone; common.



Largilliert's Venus (3") 7.5 cm
Ruditapes largillierti (Philippi, 1847). New Zealand and Tasmania. Common. Syn.: *intermedia* Quoy & Gaimard.



Californian Irus Venus (1") 2.5 cm
Irus lamellifera (Conrad, 1837). Monterey to San Diego, California. In soft shale, subtidal; common.



Stutchbury's Venus (2.5") 6.5 cm
Chione stutchburyi (Wood, 1828). New Zealand. Intertidal mud flats; common.



Cross-barred Venus (1.3") 3 cm
Chione cancellata (L., 1758). S.E. United States to Brazil. Intertidal to 20 m; abundant. Rarely rose inside.



Cross-barred Venus (1.3") 3 cm
Chione cancellata (L., 1758). This West Indian form is larger and more colorful. Syn.: *subrostrata* Lamarck.



Crass Venus (1") 2.5 cm
Chione crassa (Quoy & Gaimard, 1835). New Zealand. Offshore, 2 to 36 m; uncommon.



Smooth Pacific Venus (2.5") 6.5 cm
Chione fluctifraga (Sowerby, 1853). San Pedro, California, to W. Mexico. Intertidal; common.



Frilled California Venus (2.5") 6.5 cm
Chione undatella (Sowerby, 1835). San Pedro, California, to Peru. Shallow sand flats; common.



Common Californian Venus (2.5") 6.5 cm
Chione californiensis (Broderip, 1853). Southern California to Panama. Intertidal sands; common. Syn.: *succinctus* Valenciennes.



Kellett's Panama Venus (1.5") 3.5 cm
Chione kelletii (Hinds, 1845). W. Mexico to northern Peru. Offshore, 46 to 73 m; moderately common.



Gnidia Venus (3.5") 9 cm
Chione gnidia (Broderip & Sowerby, 1829). W. Mexico to Peru. Intertidal to 33 m; common.



Partially-rough Venus (1.7") 4.5 cm
Anomalocardia subrugosa (Wood, 1828). West Mexico to Peru. Intertidal mud flats; abundant food clam.



Imperial Venus (1") 2.5 cm
Chione latilirata (Conrad, 1841). S.E. United States to Brazil. Offshore to 40 m; common.



King Venus (1.5") 3.5 cm
Chione paphia (L., 1767). West Indies to Brazil. Shallow water; moderately common.



Clench's Venus (1") 2.5 cm
Chione clenchi Pulley, 1952. Texas to northeastern Mexico. Offshore to 60 m; uncommon.



Australian Chicken Venus (1.5") 3.5 cm
Tawera gallinula (Lamarck, 1818). South Australia. Intertidal to 40 m; common. Sometimes all white.



Squamose Venus (1") 2.5 cm
Anomalocardia squamosa (L., 1758). Indo-Pacific. Muddy sand flats; common.



Half-imbricate Venus (1.5") 3.5 cm
Chione subimbricata (Sowerby, 1835). W. Mexico to northern Peru. Intertidal sand flats; common.



Projecting Venus (1") 2.5 cm
Anomalocardia producta Kuroda & Habe, 1951. Japan to southeastern Asia. Intertidal; common. Syn.: *impressa* Anton.



West Indian Pointed Venus (1") 2.5 cm
Anomalocardia brasiliana (Gmelin, 1791). West Indies to Brazil. Shallow water; common.



Wedding Cake Venus (2.5") 6 cm
Callanaitis disjecta (Perry, 1811). South Australia; Tasmania. Subtidal to 48 m; moderately common. Syn.: *lamellata* Lamarck.



Wooden Venus (1.3") 3 cm
Bassina calophylla (Philippi, 1836). Northern Australia; East Indies. Offshore to 20 m; uncommon.



Yate's Venus (2") 5 cm
Bassina yatei (Gray, 1835). New Zealand. Sandy beach flats; common.



Tiara Venus (1.5") 3.5 cm
Placamen tiara (Dillwyn, 1817). Indo-Pacific. Subtidal to 50 m; moderately common. Syn.: *foliacea* Philippi.



Flowery Venus (1.5") 3.5 cm
Clausinella chlorotica (Philippi, 1849). Philippines and Indonesia. Shallow bays; uncommon.



Isabelle's Gray Venus (1.5") 3.5 cm
Clausinella isabellina (Philippi, 1849). Southwestern Pacific. Shallow sand flats; uncommon.



Heavy Venus (1.5") 3.5 cm
Clausinella gravescens (Menke, 1843). East Indies and Philippines. Shallow bays; uncommon.



Striated Venus (1.5") 3.5 cm
Chamelea striatula (da Costa, 1778). Norway to northwestern Africa. Intertidal to offshore; common.



Thaca Venus (3") 7 cm
Protothaca thaca (Molina, 1782). Peru to Chile. Lower intertidal flats; common. Syn.: *dombeii* Lamarck.



Northern Quahog (3.5") 9 cm
Mercenaria mercenaria (L., 1758). Eastern Canada to Georgia. Lagoons; common. Small ones called "cherrystones." Sides smooth.



Southern Quahog (4") 10 cm
Mercenaria campechiensis (Gmelin, 1791). Georgia, Florida, northwestern Cuba. Common, inshore waters. Sides rough.



Texas Quahog (3.5") 9 cm
Mercenaria mercenaria subspecies *texana* (Dall, 1902). Northern Gulf of Mexico. Shallow lagoons; common.



Brazilian Comb Venus (1.5") 4 cm
Protothaca pectorina (Lamarck, 1818). Lower Caribbean to Brazil. Intertidal; common.



Heavy-ribbed Venus (2") 5 cm
Protothaca crassicosta (Deshayes, 1835). New Zealand. Intertidal sand flats; common.



Thin-shelled Littleneck (3") 7.5 cm
Protothaca tenerrima (Carpenter, 1856). Western Canada to W. Mexico. Intertidal to 3 m; common.



Common Pacific Littleneck (2") 5 cm
Protothaca staminea (Conrad, 1837). Alaska to Baja California. Beach flats; abundant. Rarely mottled.



Jedo Venus (2.5") 6 cm
Protothaca jedoensis (Lischke, 1874). Japan; Korea; northwestern China. Intertidal to 20 m; common. Syn.: *hirasei* Pilsbry.



Beaded Venus (1.3") 3 cm
Protothaca granulata (Gmelin, 1791). West Indies. Muddy sand flats; common.



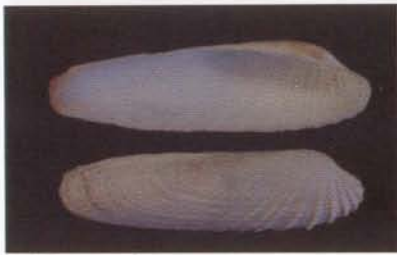
Monstrous Petricola (1") 2.5 cm
Petricola monstrosa (Gmelin, 1791). South Africa. Boring in shale; uncommon. Rare in collections.



Hearty Rupellaria (1.5") 4 cm
Rupellaria carditoides (Conrad, 1837). Western Canada to Baja California. Bores in hard rock; common.



False Angel Wing (2") 5 cm
Petricola pholadiformis (Lamarck, 1818). Eastern Canada to Uruguay; Norway to Black Sea. Bores in intertidal peat; common.



Parallel Petricola (2.5") 6 cm
Petricola parallela Pilsbry & Lowe, 1932. W. Mexico to Nicaragua. Intertidal to 15 m; common.



Atlantic Rupellaria (1") 2.5 cm
Rupellaria typica (Jonas, 1844). Southeastern United States to Brazil. Bores in coral; common.



Conrad's False Mussel (0.7") 1.8 cm
Mytilopsis leucophaea (Conrad, 1831). New York to eastern Mexico. Brackish water; common. Family Dreissenidae.

SOFT-SHELL CLAMS FAMILY MYIDAE

This family includes the popular American soft-shell or "steamer" clam which has a thin, brittle shell. The two siphons are welded into one thick tube. The hinge has a spoon-shaped shelf in the left valve. The clams live in mud several centimeters below the surface.



Soft-shell Clam (3.5") 9 cm
Mya arenaria L., 1758. Eastern Canada to North Carolina; N.W. United States. Mud flats, intertidal; common. Popular seafood.



Truncate Soft-shell Clam (2.5") 6 cm
Mya truncata L., 1758. Arctic seas to western Europe; N.E. United States; Alaska to Washington. 1 to 10 m; common.



California Glass Mya (1") 2.5 cm
Cryptomya californica (Conrad, 1837). Alaska to northern Peru. Live next to worm and crab burrows. Common.



Chubby Mya (2.5") 6 cm
Platyodon cancellatus (Conrad, 1837). Western Canada to California. Burrows in hard-packed clays in shallow water; moderately common.



African Duck Clam (1.5") 3.5 cm
Tugonia anatina (Gmelin, 1791). Western Africa. Shallow water in mud; uncommon in collections.

CORBULA CLAMS FAMILY CORBULIDAE

These small, thick-shelled clams usually have a smaller and flatter left valve which fits snugly into the larger right valve. The resilium and ligament are set in a spoon-shaped pocket. There are many species, most found offshore in sandy bottoms.



Sulcate Corbula (0.5") 1.2 cm
Corbula sulcata Lamarck, 1801. Western Africa. Offshore to 20 m; locally common.



Red-toothed Corbula (0.5") 1.2 cm
Corbula erythrodon Lamarck, 1818. Northeastern Asia; Japan. Offshore to 20 m; common.



Ovulate Corbula (1") 2.5 cm
Corbula ovulata Sowerby, 1833. W. Mexico to Peru. Sand areas, 2 to 55 m; common.



Dietz's Corbula (0.5") 1.2 cm
Corbula dietziana C. B. Adams, 1852. S.E. United States to Brazil. Offshore from 2 to 50 m; common.



Swift's Corbula (0.3") 7 mm
Corbula swiftiana C. B. Adams, 1852. Northeastern United States to Texas and West Indies. Offshore; common.



Erodon Corbula (1") 2.5 cm
Erodon mactroides (Bosc, 1802). Brazil to Argentina. Muddy bottoms in brackish water; common.

ROCK-BORER CLAMS FAMILY GASTROCHAENIDAE

This is a small family of rock- and coral-boring clams, lacking hinge teeth, and having a large foot that makes the valves widely gape. The siphons produce calcareous tubes that protrude from the substrate.



Bowl-Boring Clam (0.5") 1.2 cm
Gastrochaena cymbium Spengler, 1783. Indo-Pacific. Bores into shells and makes surface tubes. Rare. Syn.: *lagenula* Lamarck.



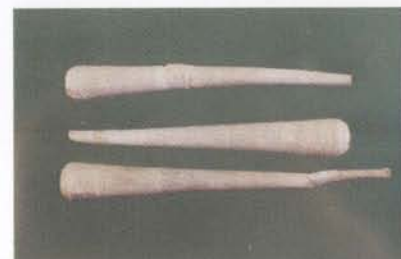
Cuneiform Clam (1") 2.5 cm
Gastrochaena cuneiformis Spengler, 1783. Indo-Pacific. Bores into Porites corals; common. Syn.: *gigantea* Deshayes; *hawaiiensis* D., B. & R.



Atlantic Rocellaria (0.7") 1.8 cm
Rocellaria hians (Gmelin, 1791). S.E. United States to Brazil. Bores into corals; common.



Atlantic Spengler Clam (1") 2.5 cm
Spengleria rostrata (Spengler, 1783). S.E. Florida to Brazil. Bores in soft coral rock; uncommon.



Club-shaped Boring Clam (4") 10 cm
Eufistulana mumia (Spengler, 1783). East Indies and Philippines. Rare. Valves inside tube. Syn.: *clava* Gmelin.

SAXICAVE and PANOPE CLAMS FAMILY HIATELLIDAE

Shells small to very large, white, with weak hinge, and with long siphons. Brown ligament external. Usually cold-water and deep mud inhabitants. Famous Geoduck Clam of America is favorite food.



Arctic Saxicave (1") 2.5 cm
Hiatella arctica (L., 1767). Arctic seas to deep, cold water in Caribbean and to off Panama. Variable shapes; common.



Atlantic Geoduck (5") 12.5 cm
Panopea bitruncata Conrad, 1872. (Pronounced "goo-ee-duk.") S.E. United States. Intertidal to 50 m; locally uncommon, deep in mud.



Pacific Geoduck (9") 23 cm
Panopea generosa (Gould, 1850). Alaska to Gulf of California. Intertidal to 10 m, in deep mud; locally common. *Panope* is misspelling.



European Panopea (9") 23 cm
Panopea glycymeris (Born, 1778). Mediterranean; N.W. Africa. 10 to 100 m; uncommon in collections. Syn.: *aldrovandi* Menard.



South American Panopea (4") 10 cm
Panopea abbreviata Valenciennes, 1839. Brazil to Antarctic. 25 to 75 m; Syn.: *antartica* Gould.



Mrs. Smith's Panopea (4") 10 cm
Panopea smithae Powell, 1950. New Zealand. Offshore to 150 m; uncommon.



New Zealand Panopea (3") 7.5 cm
Panopea zelandica (Quoy & Gaimard, 1835). Intertidal sand flats to 20 m; uncommon.



Priapus Panopea (4") 10 cm
Panomya priapus (Tilesius, 1822). Arctic seas; Alaska. Deep water. Syn.: *beringiana* Dall (holotype illustrated).

PHOLADS and PIDDOCKS FAMILY PHOLADIDAE

A worldwide, abundant group of clams that burrow into mud, clay, wood and hard rock. Pholad clams have external accessory plates. Under the beaks of the valves is a pair of shelly projections, or apophyses. The Angel Wing of Florida may live as deep as 3 feet in the mud. *Martesia* is found in floating wood.



European Piddock (4") 10 cm
Pholas dactylus L., 1758. Western Europe; Mediterranean. Bores in sandstone; common.



Campeche Angel Wing (3.5") 9 cm
Pholas campechiensis Gmelin, 1791. S.E. United States to Texas and to Brazil. Subtidal in mud or rotten wood; uncommon.



Fallen Angel Wing (2") 5 cm
Barnea truncata (Say, 1822). Eastern United States to Brazil; Senegal to Gold Coast. In peat and clay, intertidal; common.



White Piddock (2.5") 6 cm
Barnea candida (L., 1758). Norway to Mediterranean; Black Sea. In peat and clay; common.



Angel Wing (6") 15 cm
Cyrtopleura costata (L., 1758). Eastern U.S. to Brazil. In mud, as deep as two feet; locally common. Rarely pink-stained.



Wart-necked Piddock (3") 7.5 cm
Chaceia ovoidea (Gould, 1851). Central California to W. Mexico. In soft shale, 20 inches deep; common. Siphon has orange warts.



Striate Martesia (1") 2.5 cm
Martesia striata (L., 1758). S.E. United States to Brazil; W. Mexico to Peru. In floating wood; common.

PANDORA CLAMS FAMILY PANDORIDAE

Very compressed, flat clams with a pearly interior. The hinge has one or two internal ribs, rather than teeth. Top edge of one valve overlaps the other. Several dozen species, mostly cold-water dwellers.



Say's Pandora (1") 2.5 cm
Pandora trilineata Say, 1822. North Carolina to Texas. Subtidal to 120 m; moderately common.



Gould's Pandora (1.5") 4 cm
Pandora gouldiana Dall, 1886. Eastern Canada to off North Carolina. Intertidal to 200 m; common.



Unequal Pandora (1") 2.5 cm
Pandora inaequalis (L., 1758). England to Mediterranean. Intertidal to 5 m; common. Syn.: *margaritacea* Lamarck.



Punctate Pandora (1.5") 4 cm
Pandora punctata Conrad, 1837. Western Canada to Baja California. Intertidal to 40 m; common.



Grand Pandora (2") 5 cm
Pandora grandis Dall, 1877. Alaska to Oregon. Offshore, 100 m; uncommon. Holotype illustrated.

LANTERN CLAMS FAMILY LATERNULIDAE

These mud-dwellers have very delicate, pearly shells, usually fat and elongate. Most of the dozen-or-so species live in tropical seas in shallow water. The shells gape at the hind end, and the umbones have an external slit. There are no teeth in the hinge.



Duck Lantern Clam * (3") 7.5 cm
Laternula anatina (L., 1758). Indian Ocean. Shallow mud areas; common.



Truncate Lantern Clam * (3.5") 9 cm
Laternula truncata (Lamarck, 1818). Indian Ocean and southwestern Pacific. Common. Syn.: *rostrata* Lamarck.

LYONSIA CLAMS
FAMILY LYONSIIDAE

These strange little clams have weakly pearlyized shells with no hinge teeth. Under the hinge is a loose, shelly plate, or tooth, called a lithodesma. *Lyonsia* live in mud, while *Entodesma* may spin a nest or live within sponges and tunicates (sea squirts).



Pearly Lyonsia (1") 2.5 cm
Entodesma beana (Orbigny, 1842). S.E. United States to Brazil. Lives within sponges in shallow water. Uncommon.



Northwest Ugly Clam (4") 10 cm
Entodesma saxicolum Baird, 1863. Alaska to California. Found in rock crevices and holes; common.

FALSE CHAMAS
FAMILY MYOCHAMIDAE

These odd clams are mostly limited to the Australasian area. They are very compressed, somewhat pearly, usually triangular in shape, without hinge teeth, but have a free, stony lithodesma. Some species have the right valve cemented to other shells or to rocks.



Striate Myadora (1.5") 3.5 cm
Myadora striata (Quoy & Gaimard, 1835). New Zealand. Intertidal sand flats to 20 m; common.

FALSE OYSTERS
FAMILY CLEIDOTHAERIDAE

Members of this unique group of clams superficially look like oysters. They are pearly inside and the irregular right valve is cemented to rocks. There is a single, large tooth in the left valve. A lithodesma is present. The siphons are very short and separate. Limited to the Australian region.



White False Oyster (2.5") 6 cm
Cleidotherus albidus (Lamarck, 1819). Tasmania; southern Australia. Subtidal on rocks to 45 m; locally common.

SPOON CLAMS
FAMILY PERIPLMATIDAE

Widely distributed in many parts of the world in shallow seas, the *Periploma* clams are slightly pearly, fragile, with one convex and one flat valve, and without hinge teeth. A resilum rests in two spoon-shaped chondrophores.



Unequal Spoon Clam (0.8") 2 cm
Periploma margaritaceum (Lamarck, 1801). South Carolina to Texas. Intertidal sand flats; common. Syn.: *inequale* C. B. Adams.



Lea's Spoon Clam (1") 2.5 cm
Periploma leanum (Conrad, 1831). Nova Scotia to North Carolina. Offshore to 50 m; common.



Round Spoon Clam (1.5") 3.5 cm
Periploma discus Stearns, 1890. Southern California and W. Mexico. Offshore in mud bottoms; uncommon.



Western Spoon Clam (1.5") 3.5 cm
Periploma planiusculum (Sowerby, 1834). California to Peru. Subtidal to 20 m; common.



Angas's Spoon Clam (3") 7.5 cm
Periploma angasi Crosse & Fischer, 1864. Southern half of Australia. Shallow water; uncommon.

THRACIA CLAMS FAMILY THRACIIDAE

Most of these cold-water clams are porcelainous, white, smoothish, or with a chalky granular surface. There are no teeth in the hinge, but there is a spoon-shaped chondrophore pointing obliquely towards the back. Fewer than 50 known living species.



Conrad's Thracia (3") 7.5 cm
Thracia conradi Couthouy, 1838. Eastern Canada to New York. Subtidal to 300 m, 6 inches in mud; locally common.



Corbuloid Thracia (2") 5 cm
Thracia corbuloides Blainville, 1825. Mediterranean. 4 to 8 m, in sand; common.



Pubescent Thracia (2.3") 6 cm
Thracia pubescens (Pulteney, 1799). N.W. Europe to western Africa; Mediterranean. Intertidal to offshore; common.



Wavy Pacific Thracia (1.5") 3.5 cm
Cyathodonta undulata Conrad, 1849. California to Baja California. Shallow water; uncommon.

CUSPIDARIA CLAMS FAMILY CUSPIDARIIDAE

Small deep-water clams having a long extension of the back end to accommodate the siphons. External ligament elongated. Resilium in a small, spoon-shaped fossette. Numerous species.



Glacial Cuspidaria (1.3") 3 cm
Cuspidaria glacialis (G. O. Sars, 1878). Arctic seas to northern North America and northern Europe. 70 to 2,000 m; common.



Rostrate Cuspidaria (1") 2.5 cm
Cuspidaria rostrata (Spengler, 1793). Arctic seas to the West Indies. Offshore from 100 to 2,000 m; uncommon.



Noble Cuspidaria (1.5") 4 cm
Cuspidaria nobilis (A. Adams, 1864). Offshore from 50 to 200 m; moderately common.



Panama Cuspidaria (1") 2.5 cm
Cuspidaria panamensis Dall, 1908. Gulf of Panama. 1,100 m; rare in collections. Holotype illustrated.

VERTICORD CLAMS FAMILY VERTICORDIIDAE

A curious group of deep-water clams having a pearly interior, usually finely ribbed, with the beaks rolled forward above a deep lunular indentation. Ligament internal, supported by a lithodesma. Numerous species.



Sharp-ribbed Verticord (0.5") 1.2 cm
Verticordia acuticostata (Philippi, 1884). Off southern Florida and the West Indies. Deep water; uncommon.



Most Elegant Euciroa (1.5") 4 cm
Euciroa elegantissima (Dall, 1881). Off S.E. United States and Cuba in 300 to 1,500 m; rare.



Galathea Euciroa (1.5") 4 cm
Euciroa galathea Dell, 1956. New Zealand. Deep water; rare.



Rostrate Euciroa (1.5") 4 cm
Acreuciroa rostrata (Thiele & Jaekel, 1931). Japan. Deep water. Syn.: *teramachii* Kuroda.



Gould's Halicardia (1.3") 3 cm
Halicardia gouldi Dall, Bartsch & Rehder, 1938. Hawaii. Deep water; rare. Holotype illustrated.

WATERING POT CLAMS FAMILY CLAVAGELLIDAE

Resembling shelly worm tubes with a watering pot spout, these strange bivalves begin life as normally shaped clams, but soon grow long tubes as they grow deeper into the sandy bottom. Some grow in small heaps.



Austral Clavagella (1.5") 4 cm
Clavagella australis Sowerby, 1829. East Indies; Indian Ocean. Uncommon.



Vaginal Watering Pot (8") 20 cm
Brechites attrahens (Lightfoot, 1786). Indian Ocean; East Indies. Syn.: *Aspergillum* and *Penicillus vaginiferus* Lamarck. Common in muddy sand.



Giant Watering Pot (12") 30 cm
Brechites giganteus (Sowerby, 1888). Southern Japan. Buried in sand, 40 to 50 m; locally common.



Ramose Watering Pot (4") 10 cm
Brechites ramosus (Dunker, 1882). Eastern Asia. Offshore, 10 to 155 m; uncommon.



Philippine Watering Pot (8") 20 cm
Brechites strangulatus Chenu, 1843. Japan to Australia. Common. Syn.: *clavatus* and *zebuensis* Chenu.



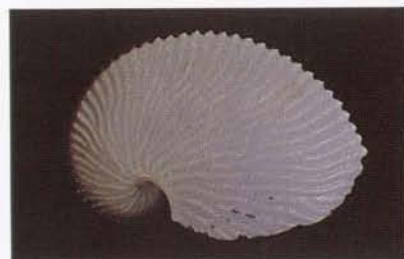
Common Watering Pot (5") 12 cm
Brechites penis (L., 1758). Indian Ocean to East Indies. Common. Syn.: *javanus* Bruguière; *aquaria* Burrow; *annulosus* Reeve.

CLASS CEPHALOPODA

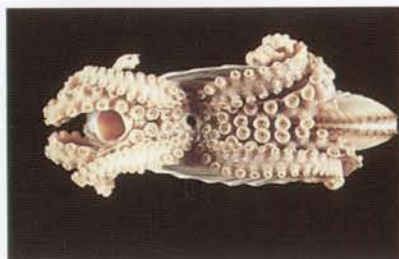
Includes the octopuses, squids, as well as the forms with shells, such as the Nautilus, *Spirula* and *Sepia* squids. There are about 650 living species; most being oceanic squids, many of which are used for bait and food. All have a parrotlike beak and radular teeth. Only shelled forms are mentioned here.

PAPER NAUTILUS
FAMILY ARGONAUTIDAE

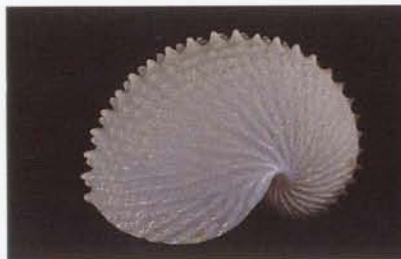
The thin, parchmentlike, white shell of this relative of the octopus is actually a cradle secreted by two of the animal's arms for the purpose of protecting its tiny eggs. Argonauts live in the open warm seas of the world. There are fewer than a dozen species.



Common Paper Nautilus (8") 20 cm
Argonauta argo L., 1758. Warm worldwide seas; pelagic. Common seasonally. Males have no shell.



Common Paper Nautilus (8") 20 cm
Argonauta argo L., 1758. Under view showing 8 tentacles. After eggs hatch, female dies and sheds "cradle."



Nodose Paper Nautilus (5") 13 cm
Argonauta nodosa Lightfoot, 1786. Indo-Pacific. Cool oceanic seas. Locally common.



Brown Paper Nautilus (1.5") 4 cm
Argonauta hians Lightfoot, 1786. Warm Pacific and Atlantic oceanic seas. Uncommon.



Brown Paper Nautilus (1.5") 4 cm
Argonauta hians Lightfoot, 1786. Some specimens have smaller and more numerous nodules. Rare.



Noury's Paper Nautilus (1.5") 4 cm
Argonauta nouryi Lorois, 1852. Baja California to Peru; uncommonly washed ashore.



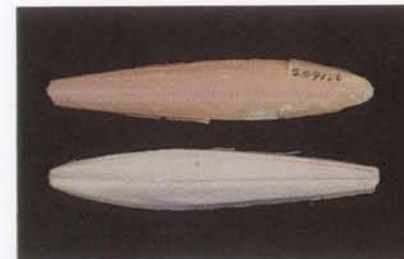
Gruner's Paper Nautilus (1.5") 4 cm
Argonauta gruneri Dunker, 1852. Southwestern Pacific. May be extreme form of *nouryi*.

SEPIA SQUIDS
FAMILY SEPIIDAE

Also known as cuttlefish and well known in Europe and the Orient as a popular seafood, the internal chalky pens of these squids are found in shell collections and are used in domestic birdcages as a source of lime. Squids give off a brown sepia ink. Our measurements refer to the interior cuttlebone.



Common Cuttlefish (5") 12 cm
Sepia officinalis L., 1758. Mediterranean; western Europe. Inshore oceanic waters; abundant.



Doubtful Squid * (6") 15 cm
Sepia incerta E. A. Smith, 1916. South Africa. Inshore water; uncommon.



Papillate Squid (8") 20 cm
Sepia papillata Quoy & Gaimard, 1832. Indian Ocean; South Africa. Open pelagic conditions; common.

SPIRULAS FAMILY SPIRULIDAE

The small, attractive coiled white shells, resembling rams' horns, found on many tropical beaches, are the internal brace for a small deepsea squid, the *Spirula*. Each of its tiny, pearly chambers contains gas. When the squid dies and its flesh rots, the shell floats to the surface of the ocean and is washed ashore.



Common Spirula (1") 2.5 cm
Spirula spirula (L., 1758). Worldwide, warm seas, living at depths of 1,000 m; dead shells on beaches. Common.

CHAMBERED NAUTILUS FAMILY NAUTILIDAE

Once dominating the ancient seas of the world, the genus *Nautilus* is now limited to fewer than a half dozen living species, all found in the southwestern Pacific. Dead shells float as far away as East Africa and Japan. The animal has about 90 tentacles. The chambers are filled with gas and keep the creature balanced in midwater.



Chambered Nautilus (6") 15 cm
Nautilus pompilius L., 1758. Philippines and Palau Islands, living colonies. Floating dead shells elsewhere. Syn.: *repertus* Iredale.



Chambered Nautilus (6") 15 cm
Nautilus pompilius L., 1758. A sectioned shell showing the internal chambers.



Chambered Nautilus (6") 15 cm
Nautilus pompilius L., 1758. A specimen sectioned in another plane, showing the hole through which a blood tube runs.



New Caledonia Nautilus (7") 18 cm
Nautilus macromphalus Sowerby, 1849. New Caledonia. Locally common in off-shore waters.



Umbilicate Nautilus (7") 18 cm
Nautilus scrobiculatus Lightfoot, 1786. New Guinea and Solomon Islands. Uncommon. Syn.: *umbilicata* Sowerby.



Common Cuttlefish * (2") 60 cm
Sepia officinalis L., 1758. Head bears 8 arms and 2 tentacles. Can change colors. In order Sepioidea. Photo by Raymon Hixon.



Plee's Arrow Squid (8") 20 cm
Doryteuthis pleii (Blainville, 1823). S.E. United States to Brazil; Bermuda. Lives near surface of open ocean; common. In order Teuthoidea. Photo by Roger T. Hanlon.



Briar Octopus (12") 30 cm
Octopus briareus Robson, 1929. S.E. United States and West Indies. Intertidal under rocks; common. In order Octopoda. Photo by Roger T. Hanlon.



Turbo-shaped Hydroid (3") 7 cm *Hydactinia echinata* (Fleming, 1828). Arctic and Boreal seas. A colony of hydroid animals. A hermit crab lives inside.



Mesoplax plates, (1.5") 4 cm long, of the boring bivalve, *Pholas orientalis* Gmelin, 1791.



Internal hinge supports, (1") 2.5 cm, of the Florida Angel Wings, *Cyrtopleura costata* (L., 1758). Once described as a *Crepidula*.



An immature "bulla" stage of the cowrie, *Cypraea tigris* L., 1758. (1") 2.5 cm. When mature, the lip thickens with teeth.



An immature stage of the **Bullmouth Helmet**, *Cypraea rufa* (L., 1758). (2") 5 cm. Adults, 3 times as large, have thick lips.



Young stage of the **Common Spider Conch**, *Lambis lambis* (L., 1758). (2") 5 cm. Adults have large projections on the outer lip.



Young stage of the **Pelican's Foot**, *Aporrhais pespelecani* (L., 1758) from Europe. (1") 2.5 cm. Adults have flaring lip with spines.



Worm tube of cemented sand grains produced by the polychaete worm, *Pectinaria*. (2") 5 cm. Tropical shallow water in sand.



Texas Longhorn, a colony of the bryozoan *Hippoporidra edax* (Busk). (3") 7 cm. Gulf of Mexico. Starts on tiny dead gastropod shell; inhabited by hermit crab.



Young stage of **Australian Trumpet**, *Syrinx aruanus* (L., 1758). (1.5") 4 cm. Early whorls developed in egg capsule. Adult shell up to (30") 80 cm.



Young stage of **Indian Volute**, *Melo melo* (Lightfoot, 1786), recently hatched. (1.3") 3 cm. Southwestern Pacific. Adults reach (10") 25 cm.



Lantern Shells. Brachiopod, *Terebratulina* species. Hole accommodates wormlike stalk. Live in sand offshore; world seas. (1.5") 4 cm. Many species.

TAXONOMIC CLASSIFICATION OF MOLLUSCA WITH MAJOR BIBLIOGRAPHIC REFERENCES

This is an outline classification of the Mollusca down to the family level with the major genera included. At various levels we have cited current works that are useful for further information on various groups. From the references given here the reader may acquire all information relating to dates, authors, generic and subgeneric groups, and geographical data of species not included in this book. Groups with an asterisk (*) are not included in this edition.

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Superfamily Patellacea (True Limpets) (formerly Docoglossa)

Family Patellidae (Limpets). Genera: *Patella* Linné, 1758; *Helcion* Montfort, 1810; *Nacella* Schumacher, 1817; *Cellana* H. Adams, 1869.

Powell, A. W. B. 1973. The patellid limpets of the world (Patellidae). *Indo-Pacific Mollusca*, vol. 3, no. 15, pp. 75-205.

Family Acmaeidae (Limpets). Genera: *Acmaea* Eschscholtz, 1833; *Lottia* Gray, 1833; *Scurria* Gray, 1847; *Colisella* Dall, 1871; *Notoacmaea* Iredale, 1915, and others.

Ponder, W. F. and R. G. Creese. 1980. A revision of the Australian species of *Notoacmaea*, *Colisella* and *Patelloida* (Acmaeidae). *Jour. Mal. Soc. Australia*, vol. 4, pp. 167-208.

Family Lepetidae (Deep-water Limpets)* Genera: *Lepeta* Gray, 1847; *Iothia* Gray, 1850 (syn: *Pilidium*); *Propilidium* Forbes, 1849.

Superfamily Cocculinacea* (Deep-water Limpets)

Family Cocculinidae* Genus: *Cocculina* Dall, 1882.

Family Lepetellidae* Genera: *Lepetella* Verrill, 1880; *Addisonia* Dall, 1882, and others.

Superfamily Trochacea (Top-Shells)

Family Trochidae (Top-Shells). Numerous genera, including in Subfamily Trochinae: *Trochus* Linné, 1758; *Tectus* Montfort, 1810; *Clanculus* Montfort, 1810. In Subfamily Umboniinae: *Umbonium* Link, 1807; *Isanda* H. and A. Adams, 1854; *Monile* Swainson, 1840. In Subfamily Solariellinae: *Solariella* Wood, 1842; *Cidarina* Dall, 1909; *Minolia* A. Adams, 1860. In Haliistylinae: *Haliistylus* Dall, 1890. In Calliostomatinae: *Calliostoma* Swainson, 1840; *Astele* Swainson, 1855; *Photinula* H. and A. Adams, 1854. In Subfamily Gibbulinae: *Gibbula* Risso, 1829; *Cittarium* Philippi, 1847; *Gaza* Watson, 1879; *Norrisia* Bayle, 1880. In Subfamily Monodontinae: *Monodonta* Lamarck, 1799; *Bankivia* Krauss, 1848; *Diloma* Philippi, 1845; *Tegula* Lesson, 1835, and others. In Subfamily Angariinae: *Angaria* Röding, 1798 (syn: *Delphinula*). In Subfamily Margaritinae: *Margarites* Gray, 1847; *Euchelus* Philippi, 1847; *Lischkeia* Fischer, 1879, and others.

Clench, W. J. & R. T. Abbott. 1943. The genera *Gaza* and *Livona* in the western Atlantic. *Johnsonia*, vol. 1, no. 12, 9 pp., illus.

Clench, W. J. & R. D. Turner. 1960. The genus *Calliostoma* in the western Atlantic. *Johnsonia*, vol. 4, no. 40, pp. 1-80, illus.

Noda, H. 1975. Turculid Gastropods of Japan. *Science Rep. Tohoku Univ. (Geol.)*, vol. 45, pp. 51-82, illus.

Nordsieck, F. 1975. The genus *Osilinus* Philippi, 1847, in the European Seas. *La Conchiglia*, vol. 6, pp. 21-23.

Perron, F. E. 1975. Carnivorous *Calliostoma* (Prosobranchia: Trochidae) from the Northeastern Pacific. *Veliger*, vol. 18, pp. 52-54.

Pilsbry, H. A. 1889. Trochidae, Stomatidae, Pleurotomariidae, Haliotidae. In Tryon's *Manual of Conchology*, Philadelphia, vol. 11, 519 pp.

Quinn, James F. 1979. Systematics and Zoogeography . . . Trochidae . . . Straits of Florida. . . *Malacologia*, vol. 19, pp. 1-62.

Rehder, H. A. 1955. The genus *Turricula* Dall. *Proc. Mal. Soc. London*, vol. 31, pp. 222-226.

Family Stomatellidae. Genera: *Stomatella* Lamarck, 1816; *Gena* Gray, 1850; *Broderipia* Gray, 1847; *Synaptocochlea* Pilsbry, 1890, and others.

Family Turbinidae. Numerous genera, including in Subfamily Astraeinae: *Astraea* Röding, 1798; *Bolma* Risso, 1826; *Cookia* Lesson, 1832; *Guildfordia* Gray, 1850. In Subfamily Turbininae: *Turbo* Linné, 1758. In Subfamily Homalopomatinae: *Homalopoma* Carpenter, 1864; *Leptothyra* Pease, 1859, and others.

Beu, A. G. and W. F. Ponder. 1979. A revision of the species of *Bolma* Risso. *Rec. Australian Mus.*, vol. 32, pp. 1-68, 19 figs.

Family Cyclostrematidae (syn: Liotiidae). Genera: *Cyclostrema* Marryat, 1818; *Liotia* Gray, 1847; *Arene* H. and A. Adams, 1854; *Liotina* Fischer, 1885; *Coronadoa* Bartsch, 1946. In Subfamily Skeneinae: *Skenea* Fleming, 1825; *Ganesa* Jeffreys, 1883; *Parviturbo* Pilsbry & McGinty, 1945, and others.

Abbott, R. Tucker. 1950. The Genus *Cyclostrema* in the Western Atlantic. *Johnsonia*, vol. 2, no. 27, pp. 193-200.

McLean, J. H. 1969. The Families Liotiidae and Skeneidae in the Eastern Pacific. *Echo*, no. 2, p. 18.

Family Phasianellidae. Genera: *Phasianella* Lamarck, 1804; *Tricolia* Risso, 1826; *Gabrielona* Iredale, 1917.

Robertson, R. 1958. The family Phasianellidae in the western Atlantic. *Johnsonia*, vol. 3, no. 37, pp. 245-283, illus.

Robertson, R. 1973. The genus *Gabrielona* (Phasianellidae) in the Indo-Pacific and West Indies. *Indo-Pacific Mollusca*, vol. 3, no. 14, pp. 41-61, illus.

Superfamily Neritacea (Nerites)

Family Neritopsidae. Genus: *Neritopsis* Grateloup, 1832.

Family Neritidae. Genus: *Nerita* Linné, 1758; *Puperita* Gray, 1857; *Neritina* Lamarck, 1816; *Neritodryas* von Martens, 1869; *Septaria* Férussac, 1807; *Theodoxus* Montfort, 1810; *Neritilia* von Martens, 1879; *Smaragdia* Issel, 1869.

Russell, H. D. 1941. The Recent mollusks of the family Neritidae of the Western Atlantic. *Bull. Mus. Comp. Zoology (Harvard)*, vol. 88, pp. 345-404, 7 pls.

- Family Helicinidae*** Terrestrial, such as *Helicina* and *Eutrocharella*.
- Family Phenacolepadidae*** Genera: *Phenacolepas* Pilsbry, 1891; *Plesiothyreus* Cossmann, 1888.
- Family Hydrocenidae*** Terrestrial genus *Hydrocena* Pfeiffer, 1847.
- Family Titiscaniidae*** Shell-less Indo-Pacific snails.

Order Caenogastropoda

- Superfamily Cyclophoracea*** Terrestrial families such as Cyclophoridae (*Cyclophorus* Montfort, 1810), Poteriidae (*Poteria* Gray, 1850), Pupinidae, and others.
- Superfamily Viviparacea*** Freshwater Apple Snails. Such genera as *Viviparus*, *Campeoloma*, *Pila*, *Pomacea*, etc.
- Superfamily Valvatacea*** Freshwater genus *Valvata* Müller, 1774.

Superfamily Littorinacea (Periwinkles)

- Family Pomatiasidae*** Terrestrial, operculate snails.
- Family Chondropomidae*** Terrestrial, operculate snails.
- Family Lacunidae.** Genus: *Lacuna* Turton, 1827. May be a subfamily of Littorinidae.
- Family Littorinidae.** Genera: *Littorina* Férussac, 1821; *Haloconcha* Dall, 1886; *Cremnoconchus* Blanford, 1869; *Peasiella* Nevill, 1884; *Tectarius* Valenciennes, 1833; *Nodilittorina* von Martens, 1897; *Echininus* Clench & Abbott, 1942, and others.
- Barkman, J. J. 1955. On the distribution and ecology of *Littorina obtusata* (L.) and its subspecific units. *Arch. Neerl. Zool.*, vol. 11, pp. 22-86.
- Clench, W. J. & R. T. Abbott. 1942. The genera *Tectarius* and *Echininus* in the western Atlantic. *Johnsonia*, vol. 1, no. 4, 4 pp., illus.
- Rosewater, J. R. 1970. The family Littorinidae in the Indo-Pacific. Part I. The subfamily Littorininae. *Indo-Pacific Mollusca*, vol. 2, no. 11, pp. 417-506, illus.
- Rosewater, J. R. 1972. The family Littorinidae in the Indo-Pacific. Part II. The subfamilies Tectariinae and Echininae. *Indo-Pacific Mollusca*, vol. 2, no. 12, pp. 507-528, illus.

Superfamily Rissoacea

- Family Hydrobiidae*** Freshwater operculate snails.
- Family Truncatellidae*** Semi-terrestrial snails.
- Families Stenothyridae* Hydrococcidae* Bithyniidae* Iravadiidae* Micromelaniidae* Assimineidae* Aciculidae**, all freshwater or semi-terrestrial snails.
- Family Vitrinellidae.** Genera: *Vitrinella* C. B. Adams, 1850; *Pseudomalaxis* Fischer, 1885; *Cochliolepis* Stimpson, 1858; *Teinostoma* H. & A. Adams, 1854, and others.
- Moore, D. R. 1965. New species of Vitrinellidae from Gulf of Mexico and Adjacent Waters. *Nautilus*, vol. 78, pp. 73-79.
- Pilsbry, H. A. & A. A. Olsson. 1945 and 1952. Vitrinellidae of the Panamic Province. *Proc. Acad. Nat. Sci. Phila.*, vol. 97, pp. 249-278, pls. 22-30; vol. 104, pp. 35-88, pls. 2-13.
- Pilsbry, H. A. & T. L. McGinty. 1945. Cyclostrematidae and Vitrinellidae of Florida. *Nautilus*, vol. 59, nos. 1-3, pp. 1-83, 4 pls.; *ibid.*, vol. 60, pp. 12-18; *ibid.*, vol. 63, pp. 85-87.
- Family Caecidae.** Genera: *Caecum* Fleming, 1813; *Meioceras* Carpenter, 1858, and others.
- Moore, D. R. 1962. The systematic position of the family Caecidae. *Bull. Marine Sci.*, vol. 12, pp. 695-701.
- Moore, D. R. 1972. Ecological and Systematic Notes on Caecidae from St. Croix, U.S. Virgin Islands. *Bull. Marine Sci.*, vol. 22, pp. 881-899.
- Family Rissoidae*** Genera: *Rissoa* Fréminville, 1814; *Alvania* Risso, 1826; *Cingula* Fleming, 1828, and others.
- Bartsch, P. 1911. The Recent and fossil mollusks of the genus *Alvania*. *Proc. U.S. Nat. Mus.*, vol. 41, pp. 333-362, pls. 29-32.
- Coan, Eugene. 1964. A proposed revision of the Rissoacean families . . . *Veliger*, vol. 6, pp. 164-171.

- Family Rissoinidae.** Genera: *Rissoina* Orbigny, 1840; *Zebina* H. & A. Adams, 1854, and others.
- Bartsch, P. 1915. Recent and fossil mollusks of the genus *Rissoina* from the West Coast of America. *Proc. U.S. Nat. Mus.*, vol. 49, pp. 33-63, pls. 28-33.
- Laseron, C. F. 1956. The Families Rissoinidae and Rissoidae from the Solanderian . . . *Australian Jour. Marine and Freshwater Res.*, vol. 7, pp. 384-484.

Superfamily Rissoellacea*

- Families Rissoellidae, Skeneopsidae, Omalogyridae, Cyclostremellidae and Cingulopsidae.** All minute marine snails.
- Robertson, R. 1961. A second Western Atlantic Rissoella and a list of the species in the Rissoellidae. *Nautilus*, vol. 75, pp. 21-26.

Superfamily Tornacea*

- Family Tornidae.** Genera: *Tornus* Turton & Kingston, 1830; *Macromphalina* Cossmann, 1888.
- For families Architectonicidae, Epitoniidae, Janthinidae, Triphoriidae, see the Order Heteropoda at the end of the Prosobranchia (after Turridae).

Superfamily Cerithiacea

- Family Turritellidae** (Turret-shells and Worm-shells). Genera: *Turritella* Lamarck, 1799; *Haustator* Montfort, 1810; *Mesalia* Gray, 1847; *Vermicularia* Lamarck, 1799.
- Garrard, T. A. 1972. A revision of Australian Recent and Tertiary Turritellidae. *Jour. Mal. Soc. Australia*, vol. 2, pp. 267-337.
- Marwick, J. 1957. Generic revision of the Turritellidae. *Proc. Mal. Soc. London*, vol. 32, pp. 144-166.
- Family Siliquariidae** (Slit Worm-shells). Genus: *Siliquaria* Bruguère, 1789.
- Family Vermetidae** (Worm-shells). Genera: *Vermetus* Daudin, 1800; *Bivonia* Gray, 1842; *Petalconchus* Lea, 1843; *Serpulorbis* Sassi, 1827; *Tripsycha* Keen, 1961.
- Hadfield, M. G., Kay, E. A. et al. 1972. The Vermetidae of the Hawaiian Islands. *Marine Biol.*, vol. 12, pp. 81-98.
- Keen, A. Myra. 1961. A Proposed Reclassification of the Gastropod family Vermetidae. *Bull. British Museum (Nat. Hist.)*, Zoology, vol. 7, pp. 181-213.
- Families Synnolopsidae,* Thiariidae,* Pleuroceridae* and Melanopsideae.*** Freshwater operculate snails.
- Family Abysochrysidae.** Genus *Abysochrysis* Tomlin, 1927.
- Houbbrick, R. S. 1979. Classification and systematic relationships of the Abysochrysidae, a relict family of bathyal snails (Prosobranchia: Gastropoda). *Smithsonian Contr. Zool.* No. 290, 21 pp., illus.
- Family Potamididae** (Horn Shells). Genera: *Cerithidea* Swainson, 1840; *Pirenella* Gray, 1847; *Pyrasus* Montfort, 1810; *Tellescopia* Montfort, 1810; *Terebralia* Swainson, 1840; *Batillaria* Benson, 1840; *Rhinocoryne* von Martens, 1900.
- Bequaert, J. C. 1942. *Cerithidea* and *Batillaria* in the western Atlantic. *Johnsonia*, vol. 1, no. 5, 11 pp., illus.
- Family Cerithiidae.** Genera: *Cerithium* Bruguère, 1789; *Gourmya* Bayle, 1884; *Clypeomorus* Jousseaume, 1888; *Rhinoclavis* Swainson, 1840; *Campanile* Bayle, 1884; and others.
- Houbbrick, R. S. 1974. The genus *Cerithium* in the western Atlantic. *Johnsonia*, vol. 5, no. 50, pp. 33-84.
- Houbbrick, R. S. 1978. The family Cerithiidae in the Indo-Pacific. Part I: The genera *Rhinoclavis*, *Pseudovertagus* and *Clavocerithium*. *Monographs of Marine Mollusca*, no. 1, 130 pp., illus.
- Jousseaume, F. P. 1931. Cerithiidae de la Mer Rouge. *Jour. de Conchyliologie*, vol. 74, pp. 270-296.
- Family Cerithiopsidae.*** Genera: *Cerithiopsis* Forbes & Hanley, 1849; *Seila* A. Adams, 1841, and others.
- Laseron, C. F. 1955. The Family Cerithiopsidae from the Solanderian and Dampierian Zoogeographical Provinces. *Australian Jour. Marine and Freshwater Res.*, vol. 7, pp. 151-182.
- Family Diastomidae.*** Genera: *Diastoma* Deshayes, 1850; *Alaba* H. & A. Adams, 1853, and others.

Family Planaxidae. Genera: *Planaxis* Lamarck, 1822; *Hinea* Gray, 1847.

Smith, E. A. 1872. A List of the Genus *Planaxis*, with Descriptions of Eleven New Species. *Ann. Mag. Natural History* (series 4), vol. 9, pp. 37-47.

Family Modulidae. Genus *Modulus* Gray, 1842.

Abbott, R. T. 1944. The genus *Modulus* in the western Atlantic. *Johnsonia*, vol. 1, no. 14, 6 pp., illus.

Superfamily Eulimacea (Aglossa)

Family Eulimidae. Genera: *Eulima* Risso, 1826; *Balcis* Leach, 1847, and others.

Family Stiliferidae.* Genera: *Stilifera* Broderip, 1832; *Mucronalia* A. Adams, 1860, and others.

Families Paedophoropodidae* and Entoconchidae.* Snails parasitic in other invertebrates.

Superfamily Hipponicacea (Hoof-Shells)

Family Hipponicidae (Hoof-Shells). Genera: *Hipponix* De France, 1819; *Malluvium* Melvill, 1906.

Morrison, J. P. E. 1965. Notes on the genera of Hipponicidae. *Bull. Amer. Malacol. Union*, vol. 32, pp. 33-34.

Family Fossariidae. Genera: *Fossarus* Philippi, 1840; *Iselica* Dall, 1918.

Family Vanikoroidae. Genus *Vanikoro* Quoy & Gaimard, 1832.

Smith, E. A. 1908. On the Known Recent Species of the Genus *Vanikoro*. *Proc. Mal. Soc. London*, vol. 8, pp. 104-117.

Superfamily Crepidulacea (syn: Calyptraeacea) (Slipper Shells)

Family Trichotropidae. Genera: *Trichotropis* Broderip & Sowerby, 1829; *Iphinoe* H. & A. Adams, 1854, and others.

Family Capulidae (Cap Shells). Genus: *Capulus* Montfort, 1810.

Family Crepidulidae (syn: Calyptraeidae). (Slipper Shells). Genera: *Calyptraea* Lamarck, 1799; *Cheilea* Modeer, 1793; *Crepidula* Lamarck, 1799; *Crucibulum* Schumacher, 1817; *Crepidatella* Lesson, 1830.

Hoagland, K. E. 1977. Systematic review of fossil and Recent *Crepidula* and discussion of evolution of the Calyptraeidae. *Malacologia*, vol. 16, pp. 353-420.

Family Xenophoridae (Carrier-Shells). Genera: *Xenophora* G. Fischer, 1807; *Stellaria* Schmidt, 1832.

Beu, A. G. 1977. New Zealand Cenozoic Gastropods of the genus *Xenophora* Fischer, 1807. *Jour. Royal Soc. N. Z.*, vol. 7, pp. 229-241, 27 figs.

Clench, W. J. & C. G. Aguayo. 1943. The genera *Xenophora* and *Tugurium* in the western Atlantic. *Johnsonia*, vol. 1, no. 8, 6 pp., illus.

Travis, Byron W. 1974. A particular study of some *Xenophora*. *Of Sea and Shore*, Winter, 1973-74, pp. 187-188; Fall, 1974, pp. 141-143.

Superfamily Strombacea

Family Strombidae (True conchs). Genera: *Strombus* Linné, 1758; *Lambis* Röding, 1798; *Terebellum* Röding, 1798; *Rimella* Agassiz, 1840.

Abbott, R. T. 1960. The genus *Strombus* in the Indo-Pacific. *Indo-Pacific Mollusca*, vol. 1, no. 2, pp. 33-146, illus.

Abbott, R. T. 1961. The genus *Lambis* in the Indo-Pacific. *Indo-Pacific Mollusca*, vol. 1, no. 3, pp. 147-174, illus.

Jung, P., & Abbott, R. T. 1967. The genus *Terebellum* (Gastropoda: Strombidae). *Indo-Pacific Mollusca*, vol. 1, no. 7, pp. 445-454, illus.

Clench, W. J. & Abbott, R. T. 1941. The genus *Strombus* in the western Atlantic. *Johnsonia*, vol. 1, no. 1, 15 pp., illus.

Walls, Jerry G. 1980. *Conchs, Tibias, and Harps*. 191 pp., color illus. T. F. H. Publications, New Jersey.

Family Aporrhaidae (Pelican's-foot). Genus: *Aporrhais* da Costa, 1778.

Family Struthiolariidae (Ostrich-foot). Genera: *Struthiolaria* Lamarck, 1816; *Perissodonta* von Martens, 1883.

Superfamily Atlantacea (Heteropoda)

Van der Spoel. 1976. Pseudothecosomata, Gymnosomata and Heteropoda. 484 pp., illus., maps. Bohn, Scheltema and Holkema, Holland.

Family Atlantidae. Genus: *Atlanta* Lesueur, 1817. Pelagic.

Family Carinariidae. Genus: *Carinaria* Lamarck, 1801. Pelagic.

Family Pterotracheidae. Naked, pelagic snails.

Superfamily Lamellariacea

Family Lamellariidae. Genera: *Lamellaria* Montagu, 1815; *Velutina* Fleming, 1821, and others.

Family Eratoidae. Genera: *Trivia* Broderip, 1837; *Erato* Risso, 1826, and others.

Families Pseudosacculidae; Asterophilidae. Parasitic snails.

Superfamily Cypraeacea

Family Cypraeidae (Cowries). Genera: *Cypraea* Linné, 1758 (numerous subgenera, such as *Mauritia*, *Zoila*, etc.).

Allan, Joyce. 1960. *Cowry Shells of World Seas*. 170 pp. Georgian House, Melbourne, Australia. Now out-dated.

Burgess, C. M. 1970. *The Living Cowries*. 389 pp., 44 color pls. A. S. Barnes & Co., Cranbury, New Jersey.

Schilder, F. A. & M. Schilder. 1939. Prodrôme of a monograph on living Cypraeidae. *Proc. Malac. Soc. London*, vol. 23, pp. 119-231.

Taylor, J., Walls, J. G. 1975. *Cowries*. 288 pp., color. illus. Neptune City, New Jersey.

Wilson, B. R. & McComb, J. A. 1967. The genus *Cypraea* (subgenus *Zoila* Jousseaume). *Indo-Pacific Mollusca*, vol. 1, no. 8, pp. 457-484, color illus.

Family Ovulidae (Egg shells). Genera: *Ovula* Bruguière, 1789; *Calpurnus* Montfort, 1810; *Primovula* Thiele, 1925; *Simnia* Risso, 1829; *Cyphoma* Röding, 1798; *Volva* Röding, 1798, and others.

Cate, C. N. 1973. A systematic revision of the Recent Cypraeid family Ovulidae (Mollusca: Gastropoda). *Veliger*, vol. 15 (Supplement), 116 pp., illus.

Family Pediculariidae. Genus *Pedicularia* Swainson, 1840.

Superfamily Naticacea

Family Naticidae (Moon Shells). Genera: *Natica* Scopoli, 1777; *Globularia* Swainson, 1840; *Policines* Montfort, 1810; *Lunatia* Gray, 1847; *Sinum* Röding, 1798, and others.

Cernohorsky, W. O. 1971. The Family Naticidae in the Fiji Islands. *Records Auckland Inst. and Mus.*, vol. 8, pp. 169-208.

Kilburn, R. N. 1976. A revision of the Naticidae of Southern Africa and Mozambique (Mollusca). *Annals Natal Mus.*, vol. 22, pp. 829-884.

Marincovich, Louie, Jr. 1977. Cenozoic Naticidae of the Northeastern Pacific. *Bull. Amer. Paleontology*, vol. 70, no. 294, pp. 169-494.

Superfamily Tonnacea

Family Tonnidae (Tun Shells). Genera: *Tonna* Brönnich, 1772; *Malea* Valenciennes, 1833; *Eudolium* Dall, 1889; In **Subfamily Oocorythinae**: *Oocorys* Fischer, 1883; *Dalium* Dall, 1889.

Kilian, R. Tonnidae. 1962. Tonnacea Teil 4. *Das Tierreich*, Lief 77, illus. Berlin.

Turner, R. D. 1948. The family Tonnidae in the western Atlantic. *Johnsonia*, vol. 2, no. 26, pp. 165-192, illus.

Family Ficidae (Fig shells). Genus: *Ficus* Röding, 1798.

Smith, E. A. 1894. A list of the Recent species of the genus *Pirula* Lamarck, with notes respecting the synonymy. *Jour. Malac.*, vol. 3, pp. 64-69.

Family Cassidae (Helmet shells). Genera: *Cassia* Scopoli, 1777; *Cypraeacassis* Stutchbury, 1837; *Casmaria* H. & A. Adams, 1853; *Phalium* Link, 1807; *Sconsia* Gray, 1847; *Galeodea* Link, 1807 (syn: *Cassidaria*); *Morum* Röding, 1798.

Abbott, R. T. 1968. The Helmet Shells of the World (Cassidae). Part 1. *Indo-Pacific Mollusca*, vol. 2, no. 9, pp. 15-201, illus.

Clench, W. J. 1944. The genera *Casmaria*, *Galeodea*, *Phalium* and *Cassia* in the western Atlantic. *Johnsonia*, vol. 1, no. 16, 16 pp., illus.

Clench, W. J., & Abbott, R. T. 1943. The genera *Cypraeacassis*, *Morum*, *Sconsia* and *Dalium* in the western Atlantic. *Johnsonia*, vol. 1, no. 9, 8 pp., illus.

Dance, S. P., & Emerson, W. K. 1967. Notes on *Morum dennisoni* (Reeve) and related species (Gastropoda: Tonnacea). *Veliger*, vol. 10, pp. 91-98, 1 pl. (Lists all recent species described up to 1967).

Superfamily Cymatiacea (Lindner, 1975)

Family Cymatiidae (Tritons). Genera: *Cymatium* Röding, 1798; *Argobuccinum* Herrmannsen, 1846; *Gyrineum* Link, 1807; *Charonia* Gistel, 1848; *Distorsio* Röding, 1798, and others.

Bayer, Ch. 1933. Catalogue of the Cymatiidae in Rijksmuseum Nat. Hist. *Zoolog. Mededeel.*, Leiden, vol. 16, pp. 33-59.

Beu, A. G. 1970. The mollusca of the genus *Charonia*. *Trans. Royal Soc. New Zealand*, vol. 11, pp. 203-223, 5 pls.

Beu, A. G. 1978. The marine fauna of New Zealand: The molluscan genera *Cymatona* and *Fusitriton*. *New Zealand Oceanogr. Inst., Memoir* 65, 44 pp., 12 figs.

Clench, W. J., & Turner, R. D. 1957. The Family Cymatiidae in the western Atlantic. *Johnsonia*, vol. 3, no. 36, pp. 189-244, illus.

Dell, R. K. & Dance, S. P. 1963. The molluscan genus *Ranella* and the distribution of *Ranella olearia* (Linnaeus). *Proc. Malac. Soc. London*, vol. 35, pp. 159-166, illus.

Emerson, W. K., & Puffer, E. L. 1953. A catalogue of the Molluscan Genus *Distorsio* (Gastropoda, Cymatiidae). *Proc. Biol. Soc. Washington*, vol. 66, pp. 93-108.

Kilius, R. 1973. Cymatiidae. Tonnacea Teil 2. *Das Tierreich*, Lief 92, illus. Berlin.

Lewis, Hal. 1972. Notes on the Genus *Distorsio* with Descriptions of New Species. *The Nautilus*, vol. 86, pp. 27-50.

Family Bursidae (Frog shells). Genus: *Bursa* Röding, 1798.

Beu, A. G. 1977. A new species of *Bufonaria* (Bursidae) from Mozambique. *Annals Natal Mus.*, vol. 23, pp. 87-91.

Morrison, J. P. E. 1949. Notes on Florida species of *Bursa*. *Annual Report, 1949, Amer. Mal. Union*, p. 10.

Oyama, K. 1964. On the confused usage of the genus *Ranella* and its allies. *Venus*, vol. 22, pp. 317-336.

Superfamily Muricacea

Family Columbariidae (Pagoda shells). Genera: *Columbarium* von Martens, 1881; *Coluzea* Allan, 1926.

Clench, W. J. 1944. The genus *Columbarium* in the western Atlantic. *Johnsonia*, vol. 1, no. 15, 4 pp., illus.

Darragh, Thos. A. 1969. A Revision of the family Columbariidae. *Proc. Royal Soc. Victoria*, vol. 83, pp. 63-119.

Family Muricidae (Murex and Rock shells). Numerous genera and subgenera. In **Subfamily Muricinae**: *Murex* Linné, 1758; *Chicoreus* Montfort, 1810; *Siratus* Jousseaume, 1880; *Homalocantha* Mörch, 1852; *Phyllonotus* Swainson, 1833, and others. In **Subfamily Ocenebrinae**: *Ocenebra* Gray, 1847; *Eupleura* H. & A. Adams, 1853; *Ceratostoma* Herrmannsen, 1846, and others. In **Subfamily Trophoninae**: *Trophon* Montfort, 1810; *Boreotrophon* Fischer, 1884, and others. In **Subfamily Typhinae**: *Typhis* Montfort, 1810; *Pterotyphis* Jousseaume, 1880, and others. In **Subfamily Thaidinae**: *Purpura* Bruguière, 1789; *Thais* Röding, 1798; *Drupa* Röding, 1798, and others. In **Subfamily Rapaninae**: *Rapana* Schumacher, 1817; *Chorus* Gray, 1847; *Forreria* Jousseaume, 1880.

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Vokes, E. H. 1964. Supraspecific groups in the subfamilies Muricinae and Tritonaiinae. *Malacologia*, vol. 2, pp. 1-41.

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Family Coralliophilidae (Syn: Magilidae). Coral-shells. Genera: *Coralliophila* H. & A. Adams, 1853; *Latiaxis* Swainson, 1840; *Lataxiena* Jousseaume, 1888; *Magilus* Montfort, 1810; *Rapa* Bruguière, 1792, and others.

D'Attilio, A. 1978. A catalog of Coralliophilidae. *Festivus* (San Diego Shell Club), vol. 10, no. 10, pp. 69-96.

Superfamily Buccinacea

Family Buccinidae (Whelks). Numerous genera, including *Buccinum* Linné, 1758; *Cantharus* Röding, 1798; *Cominella* Gray, 1850; *Engina* Gray, 1839; *Neptunea* Röding, 1798; *Phos* Montfort, 1810; *Colus* Röding, 1798; *Volutopsius* Mörch, 1857; and others.

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Family Columbelloidea (Dove-shells). Genera: *Columbella* Lamarck, 1799; *Pyrene* Röding, 1798; *Strombina* Mörch, 1852, and others.

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Family Fascioliariidae (Tulip and Spindle shells). Numerous genera, such as: *Fasciolaria* Lamarck, 1799; *Pleuroploca* Fischer, 1884; *Latirus* Montfort, 1810; *Peristernia* Mörch, 1852; *Fusinus* Rafinesque, 1815.

Bullock, R. C. 1974. A contribution to the systematics of some West Indian *Latirus*. *Nautilus*, vol. 88, pp. 69-79.

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Melville, J. C. 1911. An enumeration of the additions made to the genus *Latirus* Montfort. *Jour. Conch.*, vol. 13, pp. 164-178.

Family Melongenidae (Crown Conchs). Genera: *Busycon* Röding, 1798; *Melongena* Schumacher, 1817; *Syrinx* Röding, 1798; *Pugilina* Schumacher, 1817, and others.

Bayer, Ch. 1952. Catalogue of the genera *Melongena* and *Semifusus*. *Zoolog. Mededeel., Rijksmus. Leiden*, vol. 31, pp. 265-299.

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- Hollister, S. C. 1958. A Review of the Genus *Busycon* and its Allies-Part 1. *Palaeontographica Americana*, vol. 4, no. 28, 124 pp.

Family Nassariidae (Nassa Mud Shells). Many genera, such as: *Nassarius* Duméril, 1806; *Ilyanassa* Stimpson, 1865; *Cyllene* Gray, 1838; *Demoulia* Gray, 1838.

- Addicott, W. O. 1965. Some Western American Cenozoic gastropods of the genus *Nassarius*. *U. S. Geol. Surv. Prof. Paper*, 503-B, 60 pp.
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Superfamily Volutacea

Family Olividae. (Olive Shells). Genera: *Oliva* Bruguière, 1789; *Agaronia* Gray, 1839; *Ancilla* Lamarck, 1799; *Olivella* Swainson, 1831; *Melapium* H. & A. Adams, 1853; *Zemira* H. & A. Adams, 1853.

- Burch, J. Q., & R. L. 1963. Genus *Olivella* in eastern Pacific. *Nautilus*, vol. 77, pp. 1-8.
- Chavan, A. 1965. Essai de reclassification des Olividae: Ancillinae (Gastropoda). *Bull. Soc. Geol. de France*, vol. 7, pp. 102-109.
- Kilburn, R. N. 1981. Revision of the Genus *Ancilla* Lamarck, 1799. *Annals Natal Mus.*, vol. 24, pp. 349-463.
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- Zeigler, R. F., & Porreca, H. C. 1969. *Olive Shells of the World*. 96 pp., 13 color pls. Obtainable from Shell Cabinet, Box 29, Falls Church, Virginia 22046.

Family Turbinellidae (Syn: Vasidae). Vase shells and Chanks. Genera: *Turbinella* Lamarck, 1799 (syn: *Xancus* Röding); *Vasum* Röding, 1798; *Tudicula* H. & A. Adams, 1863; *Tudicla* Röding, 1798; *Afer* Conrad, 1858, and others.

- Abbott, R. T. 1950. The genera *Xancus* and *Vasum* in the western Atlantic. *Johnsonia*, vol. 2, no. 28, pp. 201-219, illus.
- Abbott, R. T. 1959. The family Vasidae in the Indo-Pacific. *Indo-Pacific Mollusca*, vol. 1, no. 1, pp. 15-32, illus.
- Vokes, E. H. 1964. The genus *Turbinella* in the New World. *Tulane Studies Geol.*, vol. 2, pp. 39-68, 3 pls.
- Vokes, E. H. 1966. The genus *Vasum* in the New World. *Tulane Studies Geol.*, vol. 5, pp. 1-36, 6 pls.

Family Volutomitridae. Genera: *Volutomitra* H. & A. Adams, 1853; *Microvoluta* Angas, 1877, and others.

- Cernohorsky, W. O. 1970. Systematics of the families Mitridae & Volutomitridae. *Bull. Auckland Inst. and Mus.* no. 8, 190 pp., 18 pls.

Family Mitridae (Miter shells). Genera: *Mitra* Lamarck, 1798; *Pterygia* Röding, 1798; *Imbricaria* Schumacher, 1817, and others.

- Cernohorsky, W. O. 1976. The Mitridae of the World. Part I. The subfamily Mitrinae. *Indo-Pacific Mollusca*, vol. 3, no. 17, pp. 273-528, illus.

Family Costellariidae (Syn.: Vexillidae) (Miter shells). Genera: *Vexillum* Röding, 1798; *Pusia* Swainson, 1840, and others.

- Pechar, Peter., Prior, Chris., & Parkinson, B. 1980. *Mitre Shells from the Pacific and Indian Oceans*. 56 pls. Robert Brown & Assoc. Bathurst, Australia.

Family Harpidae (Harp shells). Genera: *Harpa* Röding, 1798; *Austroharpa* Finlay, 1931.

- Rehder, H. A. 1973. The family Harpidae of the world. *Indo-Pacific Mollusca*, vol. 3, no. 16, pp. 207-274, illus.

Family Marginellidae (Margin shells). Many genera, such as *Marginea* Lamarck, 1799; *Hyalina* Schumacher, 1817; *Cystiscus* Stimpson, 1865, and others.

- Coan, E., & Roth, B. 1966. The West American Marginellidae. *Veliger*, vol. 8, pp. 276-299.

- Laseron, C. F. 1957. A New Classification of the Australian Marginellidae. *Australian Jour. Marine and Freshwater Res.*, vol. 8, pp. 274-311.

- Tomlin, J. R. le B. 1917. A systematic list of the Marginellidae. *Proc. Malac. Soc. London*, vol. 12, pp. 242-306. (A list of names with authors and dates of world-wide species.)

- Wagner, R. J. L., & Abbott, R. T. 1978. List of Marginellidae. *Standard Catalog of Shells*, Greenville, Delaware, pp. 22-001-22-015.

Family Cancellariidae (Nutmegs). Several genera (and many subgenera): *Cancellaria* Lamarck, 1799; *Admete* Kröyer, 1842; *Trigonostoma* Blainville, 1827; *Scalptia* Jousseaume, 1887, and others.

Family Volutidae (Volutes). Many genera, including: *Voluta* Linné, 1758; *Volutocorbis* Dall, 1890; *Neptuneopsis* Sowerby, 1898; *Cymbium* Röding, 1798; *Cymbiola* Swainson, 1831; *Fulgoraria* Schumacher, 1817; *Lyria* Gray, 1847; *Scaphella* Swainson, 1832; *Amoria* Gray, 1855; *Zidona* H. & A. Adams, 1853, and others.

- Clench, W. J. 1946. The genera *Bathyaurelia*, *Rehderia* and *Scaphella* in the western Atlantic. *Johnsonia*, vol. 2, no. 22, pp. 41-60, illus.

- Clench, W. J., & Turner, R. D. 1964. The Subfamilies Volutinae, Zidoninae, Odontocymbiolinae and Calliotectectinae in the western Atlantic. *Johnsonia*, vol. 4, no. 43, pp. 129-180, illus.

- Weaver, C. S., & duPont, J. E. 1970. *The Living Volutes*. 375 pp., 79 color pls. Delaware Museum of Natural History, Greenville, Delaware. Useful but out-of-date.

Superfamily Conacea

Family Conidae (Cone shells). Genus: *Conus* Linné, 1758 (many subgenera).

- Clench, W. J. 1942. The genus *Conus* in the western Atlantic. *Johnsonia*, vol. 1, no. 6, 40 pp., illus.
- Dautzenberg, Ph. 1937. Famille Conidae. *Resultats Scientifique du Voyage aux Indes Orientales Neerlandaises*, vol. 2, fascicule 18, 284 pp. Bruxelles.
- Kilburn, R. N. 1971. A Revision of the Littoral Conidae of the Cape Province South Africa. *Annals Natal Mus.*, vol. 21, pp. 37-54.
- Marsh, J. A. & Rippingale, O. H. 1974. *Cone Shells of the World*. 180 pp., illus. Jacaranda Press. 3rd ed. Out-of-date.
- Tomlin, J. R. le B. 1937. Catalogue of Recent and fossil cones. *Proc. Malac. Soc. London*, vol. 22, pp. 205-330, 333.
- Walls, Jerry G. 1978. *Cone Shells: A Synopsis of the Living Conidae*. 1011 pp. T. F. H. Publications, Neptune City, New Jersey. Very useful.

Family Terebridae (Auger shells). Genus: *Terebra* Bruguière, 1789 (and many subgenera).

- Burch, R. D. 1965. New Terebrid Species from the Indo-Pacific. *Veliger*, vol. 7, pp. 241-253.
- Dautzenberg, Ph. 1935. Famille Terebridae (et Mitridae). *Resultats Scientifiques du Voyage aux Indes Orientales Neerlandaises*, vol. 2, fascicule 17, 208 pp. Bruxelles.
- Salisbury, R. 1978. Hawaii's Fifty-odd Terebra. *Hawaiian Shell News*, vol. 26, no. 8, pp. 7-10.

Family Turridae (Turrids). Numerous genera and subgenera, including: *Turris* Röding, 1798; *Gemmula* Weinkauff, 1875; *Polystira* Woodring, 1928; *Clavatula* Lamarck, 1801; *Clavus* Montfort, 1810; *Drillia* Gray, 1838; *Mangelia* Risso, 1826; *Thatcheria* Angas, 1877, and others.

- Hedley, C. A. 1922. A Revision of the Australian Turridae. *Records Australian Mus.*, vol. 13, pp. 213-259.
- McLean, J. H. 1971. A Revised Classification of the Family Turridae from the Eastern Pacific. *Veliger*, vol. 14, pp. 114-130.
- Powell, A. W. B. 1964. The family Turridae in the Indo-Pacific. Part I. The subfamily Turrinae. *Indo-Pacific Mollusca*, vol. 1, no. 5, pp. 227-345, illus.
- Powell, A. W. B. 1966. The Molluscan Families Speightiidae and Turridae. *Bull. 5, Auckland Institute and Museum*, 184 pp.
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Order Heterogastropoda Superfamily Architectonicacea

Family Architectonicidae (Sundials). Genera: *Architectonica* Röding, 1798; *Heliacus* Orbigny, 1842; *Philippia* Gray, 1847.

- Bayer, Charles. 1948. Catalogue of the Solariidae in the Rijksmuseum van Natuurlijke Hist. Zool. *Verhandel.* no. 4, 44 pp.
- Marche-Marchad, J. 1969. Les Architectonicidae de la Cote Occidentale d'Afrique. *Bull. Inst. Fondament. d'Afr. Noire*, ser. A, vol. 31, pp. 461-486, 10 figs.
- Robertson, R. 1970. Systematics of Indo-Pacific *Philippia* (Psilaxis), Architectonicid gastropods with eggs. *Pacific Science*, vol. 24, pp. 66-83.
- Robertson, R. 1973. On the fossil history and intrageneric relationships of *Philippia* (Architectonicidae). *Proc. Acad. Nat. Sci., Phila.*, vol. 125, pp. 37-46.

Family Epitonidae (Wentletraps). Many genera, including: *Epitonium* Röding, 1798 (syn: *Scalaria* Lamarck); *Amaea* H. & A. Adams, 1853; *Sthenorytis* Conrad, 1862; *Cirsotrema* Mörch, 1852; *Opalia* H. & A. Adams, 1853.

- Clench, W. J., & Turner, R. D. 1950. The genera *Sthenorytis*, *Cirsotrema*, *Acirsa*, *Opalia* and *Amaea* in the western Atlantic. *Johnsonia*, vol. 2, no. 29, pp. 221-246, illus.
- Clench, W. J., & Turner, R. D. 1951. The genus *Epitonium* in the western Atlantic. Part I. *Johnsonia*, vol. 2, no. 30, pp. 249-288, illus.
- Clench, W. J., & Turner, R. D. 1952. The genera *Epitonium* (Part II), *Depressiscala*, *Cylindriscala*, *Nystiella* and *Solutiscala* in the western Atlantic. *Johnsonia*, vol. 2, no. 31, pp. 289-356, illus.

Family Janthinidae (Purple Sea Snails). Genera: *Janthina* Röding, 1798; *Recluzia* Petit, 1853.

- Laursen, Dan. 1953. The genus *lanthina* [Janthina]. *Monograph. Dana-Reports*, vol. 6, pp. 1-40.

Families Acclididae,* Mathildidae,* Toriniidae* and Triphoridae.* Small marine snails.

- Kosuge, S. 1966. The family Triphoridae and its Systematic Position. *Malacologia*, vol. 4, pp. 297-324.
- Marshall, B. A. 1977. The Dextral Triflorid Genus *Metaxia* in the South-west Pacific. *New Zealand Jour. Zool.*, vol. 4, pp. 111-117.

Subclass Opisthobranchia (Bubble shells and Sea Hares) (Arrangement after T. E. Thompson, Ph.D.)

- Marcus, Ernest & Evelyn. 1967. *Tropical American Opisthobranchs. Studies Tropical Oceanography*, Miami, vol. 6, pp. 3-137.
- Pilsbry, H. A. 1843-1896. Order Opisthobranchiata. In Tryon's *Manual of Conchology*, Philadelphia. vols. 15 (436 pp., 61 pls.) and 16 (262 pp., 74 pls.).
- Thompson, T. E. 1976. *Biology of Opisthobranch Molluscs*. vol. 1, 207 pp. Ray Society, London.

Family Acteonidae (Acteons). Genera: *Acteon* Montfort, 1810; *Pupa* Röding, 1798 (syn: *Solidula*), and others.

- Rudman, W. B. 1971. The family Acteonidae in New Zealand. *Jour. Mal. Soc. Australia*, vol. 2, pp. 205-214.

Family Bullinidae. Genus: *Bullina* Férussac, 1822.

- Rudman, W. B. 1971. The genus *Bullina* in New Zealand. *Jour. Mal. Soc. Australia*, vol. 2, pp. 195-203.

Family Hydatinidae. Genera: *Hydatina* Schumacher, 1817; *Micromelo* Pilsbry, 1895.

Suborder Diaphanacea*

Family Diaphanidae. Genera: *Diaphana* Brown, 1827, and others.

Family Notodiaphanidae. Genus: *Notodiaphana* Thiele, 1917.

Suborder Retusacea*

Family Retusidae. Genera: *Retusa* Brown, 1827; *Rhizorus* Montfort, 1810.

Suborder Ringiculacea*

Family Ringiculidae. Genus: *Ringicula* Deshayes, 1838.

Suborder Bullacea

Family Bullidae (Bubble Shells). Genus: *Bulla* Linné, 1758.

- Willan, R. C. 1978. The nomenclature of three Pacific *Bulla* species. *Jour. Mal. Soc. Australia*, vol. 4, pp. 57-68.

Suborder Atyacea

Family Atyidae. Genera: *Atys* Montfort, 1810; *Haminoea* Turton & Kingston, 1830, and others.

Suborder Philinacea

Families Scaphandridae (*Scaphander* Montfort, 1810); **Gastropteridae,* Aglajidae,* Philinidae,* Philinoglossidae.***

- Bullis, H. 1956. The genus *Scaphander* in the Gulf of Mexico and notes on the western Atlantic species. *Bull. Marine Science*, vol. 6, pp. 1-17.

Suborder Runcinacea*

Family Runcinidae. Genus: *Runcina* Forbes & Hanley, 1853.

Order Pyramidellomorpha

Family Pyramidellidae. Numerous genera: *Pyramidella* Lamarck, 1799; *Odostomia* Fleming, 1813, and others.

- Dall, W. H., & Bartsch, Paul. 1909. Monograph of West American Pyramidellid Mollusks. *Bull. 68, U. S. Nat. Mus.*, 258 pp.
- Laseron, C. F. 1959. The Family Pyramidellidae from North Australia. *Australian Jour. Marine and Freshwater Res.*, vol. 10, pp. 177-267.
- Melville, J. C. 1910. A revision of the species of Pyramidellidae occurring in the Persian Gulf, Gulf of Oman and North Arabian Sea. *Proc. Mal. Soc. London*, vol. 9, pp. 171-206.

Order Thecosomata (Pteropods)

Families Limacinidae and Cavoliniidae. Genera: *Limacina* Bosc, 1817; *Cavolinia* Abildgaard, 1791; *Clio* Linné, 1767.

- van der Spoel, S. 1976. Pseudotheosomata, Gymnosomata and Heteropoda (Gastropoda), 484 pp., 246 figs. Bohn, Scheltema & Holkema, Utrecht, Holland.

Families Peraclidae,* Cymbuliidae,* Desmopteridae.*

Order Gymnosomata* (Naked Pteropods, several families)

Order Aplysiomorpha* (Aplysia Sea Hares and Akeridae)

Order Pleurobranchomorpha* (Sea Slugs)

Order Acochliidae* (Sand Nudibranchs)

Order Sacoglossa* (Sea Slugs)

Order Nudibranchia* (Sea Slugs)

Subclass Pulmonata* (Air-breathing land snails)

Order Basommatophora

Superfamily Siphonariacea

Family Siphonariidae (False limpets). Genus: *Siphonaria* Sow-erby, 1823.

- Hubendick, B. 1946. Systematic monograph of the Patelliformia. *Kungl. Svenska Vetensk. Handl.*, ser. 3, vol. 23, no. 5, pp. 1-93, 6 pls.

Family Trimusculidae. Genus: *Trimusculus* Schmidt, 1818.

Family Amphibolidae. Genus: *Amphibola* Schumacher, 1817.

Superfamily Melampioacea

Family Melampidae. Genera: *Melampus* Montfort, 1810; *Ellobium* Röding, 1798; *Pedipes* Bruguière, 1792, and others.

Clench, W. J. 1964. The genera *Pedipes* and *Laemodonta* in the Western Atlantic. *Johnsonia*, vol. 4, no. 42, pp. 117-127.

Hubendick, B. 1956. A Conchological Survey of the Genus *Plecotrema* (Ellobiidae). *Proc. Mal. Soc. London*, vol. 32, pp. 110-126.

Morrison, J. P. E. 1964. Notes on American Melampidae. *Nautilus*, vol. 77, pp. 119-121.

Family Otinidae. Genus: *Otina* Gray, 1847

Class Polyplacophora
(Chitons)

Burghardt, G. E., & L. E. 1969. A collector's guide to West Coast chitons. San Francisco Aquarium Soc. Special Pub. no. 4, 45 pp., 4 pls.

Haddon, A. 1886. Report on the Polyplacophora. *Report Scientific Results Voyage Challenger. Zoology*, vol. 15.

Iredale, T., & Hull, A. 1923-1925. Monograph of the Australian loricates. *Australian Zoologist*, vol. 3.

Kaas, P. 1972. Polyplacophora of the Caribbean Region. *Uitgaven Natuurw. Stud. Kring Suriname*, no. 71, pp. 1-162, 9 pls.

Kaas, P., & van Belle, R. A. 1980. *Catalogue of Living Chitons*. 144 pp. W. Backhuys, Publ., Rotterdam.

Yakovleva, A. M. 1965. Shell bearing mollusks (Loricata) of the USSR. Israel Program Sci. translations, Jerusalem, 127 pp. (*Zool. Inst. Akad. Nauk USSR*, no. 45).

Order Paleoloricata*
(Ancient Chitons)

Families Lepidopleuridae, Hanleyidae,* Chorioplacidae.*

Order Neoloricata
(Modern Chitons)

Suborder Ischnochitonina

Families Ischnochitonidae; Schizoplacidae; Chitonidae; Callochitonidae; Mopaliidae; Chaetopleuridae.

Suborder Acanthochitonina

Family Acanthochitonidae. Genus: *Acanthochitona* Gray, 1821.

Class Scaphopoda
(Tusk-shells)

Emerson, W. K. 1962. A classification of the scaphopod mollusks. *Jour. Paleo.*, vol. 36, pp. 461-482.

Habe, T. 1964. Scaphopoda of Japan. *Fauna Japonica. Biogeographical Society of Japan*, Tokyo, 59 pp.

Henderson, J. B. 1920. A monograph of the East American Scaphopod Mollusks. *Bull. 111, U.S. Nat. Mus.*, 177 pp., 20 pls.

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Family Dentaliidae. Genus: *Dentalium* Linné, 1758.

Family Siphonodentaliidae. Genera: *Siphonodentalium* Sars, 1859; *Cadulus* Philippi, 1884, and others.

Class Bivalvia
(Pelecypoda; Clams)

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Vokes, H. E. 1967. Genera of the Bivalvia: a systematic and bibliographic catalog. *Bull. Amer. Paleont.*, vol. 51, no. 232.

Order Nuculoida

Family Nuculidae (Nut clams). Genera: *Nucula* Lamarck, 1799; *Acila* H. & A. Adams, 1858, and others.

Schenck, H. G. 1934. Classification of Nuculid Pelecypods. *Bull. Mus. Roy. Hist. Nat. Belg.*, vol. 10, no. 20, 77 pp.

Family Nuculanidae. Genera: *Nuculana* Link, 1807; *Adrana* H. & A. Adams, 1858; *Yoldia* Möller, 1842, and others.

Family Malletiidae. Genera: *Malletia* Des Moulins, 1832; *Tindaria* Bellardi, 1875, and others.

Order Solemyoida
(Awning clams)

Family Solemyidae. Genus: *Solemya* Lamarck, 1818.

Subclass Pteriomorpha

Order Arcoida

Family Arcidae (Ark shells). Genera: *Arca* Linné, 1758; *Barbatia* Gray, 1842; *Trisidos* Röding, 1798; *Anadara* Gray, 1847; *Scapharca* Gray, 1847; *Senilia* Gray, 1842.

Habe, T. 1965. The Arcid subfamily Anadarinae in Japan and its adjacent areas. *Bull. Nat. Sci. Mus., Tokyo*, vol. 8, pp. 71-85, 2 pls.

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Family Noetiidae. Genus: *Noetia* Gray, 1857, and others.

Family Cucullaeidae. Genus: *Cucullaea* Lamarck, 1801.

Superfamily Limopsacea

Family Limopsidae. Genera: *Limopsis* Sassi, 1827, and others.

Family Glycymerididae (Bittersweet clams). Genera: *Glycymeris* da Costa, 1778; *Axinactis* Mörch, 1861, and others. (Glycymeridae is incorrect.)

Nicol, D. 1945. Genera and Subgenera of the Pelecypod Family Glycymeridae. *Jour. Paleont.*, vol. 19, pp. 616-621.

Families Manzanellidae* and Philobryidae.* Minute deep-water clams.

Order Mytiloida

Superfamily Mytilacea

Family Mytilidae (Marine mussels). Many genera. In **Subfamily Mytilinae:** *Mytilus* Linné, 1758; *Aulacomya* Mörch, 1853; *Brachidontes* Swainson, 1840; *Geukensia* Poel, 1959; *Perna* Retzius, 1788; *Septifer* Récluz, 1848. In **Subfamily Crenellinae:** *Crenella* Brown, 1827; *Musculus* Röding, 1798; *Adula* H. & A. Adams, 1857. In **Subfamily Modiolinae:** *Modiolus* Lamarck, 1799; *Amygdalum* Mühlfeld, 1811, and others.

Lamy, E. 1936. Revision des Mytilidae Vivants. *Jour. de Conchyl.*, vol. 80, pp. 66-102, 107-198, 229-295, 307-363.

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Turner, R. D., & Boss, K. J. 1962. The genus *Lithophaga* in the western Atlantic. *Johnsonia*, vol. 4, no. 41, pp. 81-116, illus.

Superfamily Pinnacea

Family Pinnidae (Pen shells). Genera: *Pinna* Linné, 1758; *Atrina* Gray, 1842; *Streptopinna* von Martens, 1880.

Rosewater, J. R. 1961. The family Pinnidae in the Indo-Pacific. *Indo-Pacific Mollusca*, vol. 1, no. 4, pp. 175-226, illus.

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Order Pterioida

Superfamily Pteriacea

Family Pteriidae (Pearl oysters). Genera: *Pteria* Scopoli, 1777; *Pinctada* Röding, 1798, and others.

Family Isognomonidae (Mangrove oysters). Genera: *Isognomon* Lightfoot, 1786; *Crenatula* Lamarck, 1803.

Fischer-Piette, E. 1976. Revision des Aviculidées 1. *Crenatula*, *Pedalion*, *Foramellina*. *Jour. de Conchyl.*, vol. 113, pp. 3-42.

Family Malleidae (Hammer oysters). Genera: *Malleus* Lamarck, 1799; *Vulsella* Röding, 1798.

Boss, K. J., & Moore, D. R. 1967. Notes on *Malleus* (*Parimalleus*) *candeanus* (Orbigny). *Bull. Marine Science*, vol. 17, pp. 85-94.

Superfamily Pectinacea

Family Pectinidae (Scallops). Numerous genera and subgenera: *Pecten* Müller, 1776; *Amusium* Röding, 1798; *Chlamys* Röding, 1798; *Argopecten* Monterosato, 1899; *Nodipecten* Dall, 1898; *Placopecten* Verrill, 1897; *Hinnites* DeFrance, 1821; *Pedum* Lamarck, 1799, and others.

Bavay, A. 1936. In Lamy's Catalogue des Pectinidae Vivants du Mus. National d'Hist. Natur. Paris. *Jour. de Conchyl.*, vol. 79, pp. 306-321.

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Roth, Barry. 1975. Description of a new species of pectinid bivalve from the Juan Fernandez Islands, Chile. *Jour. Mal. Soc. Australia*, vol. 3, no. 2, pp. 81-87.

Waller, Thomas R. 1972. The Pectinidae of Eniwetok Atoll, Marshall Islands. *Veliger*, vol. 14, no. 3, pp. 221-264.

Suborder Ostreina

Superfamily Ostreacea
(Oysters)

Galtsoff, Paul S. 1964. *The American Oyster*. 480 pp. Bulletin 64, U. S. Fish and Wildlife Service, Wash., D. C.

Joyce, E. A., Jr. 1972. A partial bibliography of oysters, with annotations. *Special Sci. Report No. 34*, 846 pp., Florida Dept. Natural Resources. Abstracts of 4,117 research papers.

Stenzel, H. B. 1971. Oysters. In Bivalvia, Part IV, vol. 3 of *Treatise on Invertebrate Paleontology*. *Geol. Soc. Amer.*, pp. 953-1224.

Family Gryphaeidae. Genera: *Hyotissa* Stenzel, 1971; *Neopycnodonte* Stenzel, 1971.

Family Ostreidae. Genera: *Ostrea* Linné, 1758; *Crassostrea* Sacco, 1897; *Lopha* Röding, 1798; *Saccostrea* Dollfus & Dautzenberg, 1920.

Family Plicatulidae (Kitten paws). Genus: *Plicatula* Lamarck, 1801.

Yonge, C. M. 1975. The status of the Plicatulidae and the Dimyidae in relation to the superfamily Pectinacea. *Jour. Zool. London*, vol. 176, pp. 545-553.

Family Spondylidae (Thorny oysters). Genus: *Spondylus* Linné, 1758.

Fulton, Hugh C. 1915. A list of the Recent Species of *Spondylus* Linné, with some Notes and Descriptions of Six New Forms. *Jour. of Conchology*, vol. 14, nos. 11 & 12.

Family Dimyidae. Genus: *Dimya* Rouault, 1850.

Superfamily Anomiacea

Family Anomiidae (Jingle shells). Genera: *Anomia* Linné, 1758; *Placuna* Lightfoot, 1786; *Enigmonia* Iredale, 1918; *Pododemus* Philippi, 1837, and others.

Superfamily Limacea

Family Limidae (File clams). Genera: *Lima* Bruguière, 1797; *Acesta* H. & A. Adams, 1858; *Limea* Brown, 1831, and others. Lamy, E. 1930-31. Revision des Limidae Vivants. *Jour. de Conchyl.*, vol. 74, nos. 2, 3 & 4.

Subclass Palaeoheterodonta
Order Trigoniidea

Family Trigoniidae. Genus: *Neotrigonia* Cossmann, 1912.

Subclass Heterodonta
Order Veneroida

Superfamily Lucinacea

Family Lucinidae (Lucine clams). Numerous genera: *Lucina* Bruguière, 1797; *Phacoides* Agassiz, 1845; *Codakia* Scopoli, 1777; *Miltha* H. & A. Adams, 1857; *Anodontia* Link, 1807; *Divaricella* von Martens, 1880, and others.

Chavan, A. 1937-38. Essai Critique de Classification des Lucines. *Jour. de Conchyl.*, vol. 81, pp. 133-153; 198-216; 237-282; 59-97; 105-130; 215-243.

Chavan, A. 1951. Essai Critique de Classification des Divaricella. *Bull. Inst. Royal Sci. Nat. Belgique*, vol. 27, pp. 1-27.

Family Fimbriidae (Fimbria clams). Genus: *Fimbria* Mühlfeld, 1811.

Nicol, David. 1950. Recent species of the lucinoid pelecypod Fimbria. *Jour. Wash. Acad. Sci.*, vol. 40, pp. 82-87.

Family Thyasiridae (Thyasira clams). Genus: *Thyasira* Leach, 1818.

Family Ungulinidae (Diplodon clams). Genera: *Ungulina* Roissy, 1805; *Diplodonta* Brown, 1831, and others.

Chavan, A. 1962. Essai critique de classification des Ungulinidae [Diplodontidae]. *Bull. Inst. Royal Sci. Nat. Belgique*, vol. 38, pp. 1-23.

Superfamily Chamacea

Family Chamidae (Jewel Boxes). Genera: *Chama* Linné, 1758; *Arcinella* Schumacher, 1817; *Pseudochama* Odhner, 1917.

Bayer, F. M. 1943. The Florida species of the family Chamidae. *Nautilus*, vol. 56, pp. 116-124.

Nicol, D. 1952. Nomenclatorial review of genera and subgenera of Chamidae. *Jour. Wash. Acad. Sci.*, vol. 52, pp. 154-156.

Nicol, D. 1952. Revision of the pelecypod genus *Echinochama*. *Jour. Paleont.*, vol. 26, pp. 803-817, 2 pls.

Superfamily Galeommatacea*
(small Lepton clams)

Families *Galeommataceae**, *Erycinidae**, *Kelliidae**, *Leptonidae**, *Montacutidae**, *Chlamydoconchidae**, and others.

Superfamily Carditacea

Family Carditidae (Carditid clams). Genera: *Cardita* Bruguière, 1792; *Beguina* Röding, 1798; *Venericardia* Lamarck, 1801, and others.

Lamy, E. 1922. Revision des Carditacea Vivants du Museum National d'Histoire Naturelle de Paris. *Jour. de Conchyl.*, vol. 66, pp. 218-368.

Family Condyllocardiidae*. Genera: *Condyllocardia* Bernardi, 1896; *Cuna* Hedley, 1902, and others.

Superfamily Crassatellacea

Family Astartidae. Genus: *Astarte* Sowerby, 1816, and others.

Family Crassatellidae. Genera: *Crassinella* Guppy, 1874; *Eucrasatella* Iredale, 1924, and others.

- Darragh, T. A. 1964. A preliminary revision of the living species of *Eucrassatella*. *Jour. Mal. Soc. Australia*, no. 8, pp. 3-9.
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- Lamy, E. 1917. Revision des Crassatellidae vivants du Museum d'histoire naturelle de Paris. *Jour. de Conchyl.*, vol. 62, pp. 197-270.

Superfamily Cardiacea (Cockles)

Family Cardiidae (Cockles). Numerous genera: *Cardium* Linné, 1758; *Trachycardium* Mörch, 1853; *Fragum* Röding, 1798; *Corculum* Röding, 1798; *Nemocardium* Meek, 1876; *Laevicardium* Swainson, 1840; *Clinocardium* Keen, 1936; *Serripes* Gould, 1841, and others.

- Clench, W. J., & Smith, L. C. 1944. The family Cardiidae in the western Atlantic. *Johnsonia*, vol. 1, no. 13, 32 pp., illus.
- Kafanov, A. I. 1980. Systematics of the subfamily Clinocardiinae Kafanov, 1975. *Malacologia*, vol. 19, pp. 297-328.
- McLean, R. A. 1956. The Cardiidae of the western Atlantic. *Mem. Soc. Cub. Hist. Nat.*, vol. 13, pp. 157-173.

Superfamily Tridacnacea (Giant Clams)

Family Tridacnidae. Genera: *Tridacna* Bruguière, 1797; *Hippopus* Lamarck, 1799.

- Rosewater, J. R. 1965. The family Tridacnidae in the Indo-Pacific. *Indo-Pacific Mollusca*, vol. 1, no. 6, pp. 347-396, illus.

Superfamily Mactracea

Family Mactridae (Surf or Trough clams). Numerous genera: *Mactra* Linné, 1767; *Rangia* Des Moulins, 1832; *Spisula* Gray, 1837; *Lutraria* Lamarck, 1799; *Tresus* Gray, 1853; *Anatina* Schumacher, 1817; *Raeta* Gray, 1853, and others.

- Lamy, Ed. 1916. Revision des Mactridae vivants. *Jour. de Conchyl.*, vol. 61, pp. 173-291.

Family Mesodesmatidae (Giant Wedge clams). Genera: *Mesodesma* Deshayes, 1832; *Atactodea* Dall, 1898; *Davila* Gray, 1853; *Ervilia* Turton, 1822, and others.

- Lamy, Ed. 1915. Revision des Mesodesmatidae vivants du Museum d'Hist. Nat. Paris. *Jour. de Conchyl.*, vol. 62, pp. 1-50.

- Sakurai, K., & Habe, T. 1973. Family Mesodesmatidae of Japan and Adjacent Areas with the Description of a New Species. *Venus*, vol. 32, pp. 4-8.

Superfamily Solenacea

Family Solenidae (Razor and Jackknife clams). Genus: *Solen* Linné, 1758.

- Habe, T. 1965. Family Solenidae in Japan and its adjacent areas. *Venus*, vol. 23, pp. 188-197, 1 pl.

Family Cultellidae. Genera: *Ensis* Schumacher, 1817; *Cultellus* Schumacher, 1817; *Pharella* Gray, 1854; *Siliqua* Mühlfeld, 1811.

- Van Urk, R. M. 1964. The genus *Ensis* in Europe. *Basteria*, vol. 28, pp. 13-44.

Superfamily Tellinacea

Family Tellinidae (Tellin clams). Numerous genera: *Tellina* Linné, 1758; *Strigilla* Turton, 1822; *Macoma* Leach, 1819; *Apolymetis* Salisbury, 1929; *Gastrana* Schumacher, 1817; *Psammotreta* Dall, 1900, and others.

- Boss, K. J. 1966. The subfamily Tellininae in the western Atlantic. The genus *Tellina* (Part I). *Johnsonia*, vol. 4, no. 45, pp. 217-272, illus.

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- Boss, K. J. 1969. The Subfamily Tellininae in South African Waters. *Bull. Mus. Comparative Zoology*, vol. 138, no. 4, pp. 81-162.

- Coan, E. V. 1971. The Northwest American Tellinidae. *Veliger*, suppl. to vol. 14, 63 pp., 12 pls.

Family Donacidae (Wedge or Bean clams). Genera: *Donax* Linné, 1758; *Hemidonax* Mörch, 1870; *Iphigenia* Schumacher, 1817, and others.

Family Psammobiidae (Garidae) (Sunset clams). Genera: *Gari* Schumacher, 1817; *Asaphis* Modeer, 1793; *Heterodonax* Mörch, 1853; *Sanguinolaria* Lamarck, 1799; *Soletellina* Blainville, 1824.

Family Scrobiculariidae. Genus: *Scrobicularia* Schumacher, 1815.

- Lamy, E. 1914. Revision des Scrobiculariidae Vivants. *Jour. de Conchyl.*, vol. 61, pp. 243-268.

Family Semelidae (Semele clams). Genera: *Semele* Schumacher, 1817; *Abra* Lamarck, 1818; *Cumingia* Sowerby, 1883; *Theora* H. & A. Adams, 1856, and others.

- Boss, K. J. 1972. The genus *Semele* in the western Atlantic. *Johnsonia*, vol. 5, no. 49, pp. 1-32, 12 pls.

Family Solecurtidae (False Razor clams). Genera: *Solecurtus* Blainville, 1824; *Azorinus* Récluz, 1869; *Pharus* Brown, 1844; *Tagelus* Gray, 1847, and others.

Superfamily Gaimardiacea*

Family Gaimardiidae.* Genus: *Gaimardia* Gould, 1852.

Superfamily Arcticacea

Family Arcticidae. Genus: *Arctica* Schumacher, 1817.

Family Bernardinidae.* Genus: *Bernardina* Dall, 1910.

Family Trapeziidae. Genera: *Trapezium* Mühlfeld, 1811; *Coralio-phaga* Blainville, 1824.

- Solem, G. A. 1954. Living Species of the Pelecypod Family Trapeziidae. *Proc. Mal. Soc. London*, vol. 31, pp. 64-84.

Superfamily Glossacea

Family Glossidae (formerly Isocardiidae) (Oxheart clams). Genus: *Glossa* Poli, 1795; *Meiocardia* H. & A. Adams, 1857.

Family Vesicomidae. Genus: *Vesicomya* Dall, 1886.

Superfamily Veneracea

Family Veneridae (Venus clams). Many genera and subgenera. Genera: *Venus* Linné, 1758; *Periglypta* Jukes-Browne, 1914; *Gafrarium* Röding, 1798; *Sunetta* Link, 1807; *Tivela* Link, 1807; *Pitar* Römer, 1857; *Saxidomus* Conrad, 1837; *Dosinia* Scopoli, 1777; *Tapes* Mühlfeld, 1811; *Paphia* Röding, 1798; *Venerupis* Lamarck, 1818; *Chione* Mühlfeld, 1811; *Merccaria* Schumacher, 1817; *Protothaca* Dall, 1902, and others.

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- Fischer-Piette, E., & Metivier, B. 1971. Revision des Tapetinae. *Memoires de Museum Nat. d'Histoire Naturelle (N.S.)*, Ser. A, Zool., vol. 71, pp. 1-106, 15 pls.

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- Palmer, K. V. W. 1927. The Veneridae of eastern America, Cenozoic and Recent. *Palaeontol. Americana*, vol. 1, pp. 209-522, 45 pls.

Family Petricolidae. Genus: *Petricola* Lamarck, 1801.
Family Cooperellidae. Genus: *Cooperella* Carpenter, 1864.

Order Myoida
Superfamily Myacea

Family Myidae (Soft-shell clams). Genera: *Mya* Linné, 1758; *Cryptomya* Conrad, 1848; *Platodon* Conrad, 1837, and others.

Foster, R. W. 1946. The genus *Mya* in the western Atlantic. *Johnsonia*, vol. 2, no. 20, pp. 29-35, illus.

Family Corbulidae (Corbula clams). Genus: *Corbula* Bruguière, 1797.

Vokes, H. E. 1945. Supraspecific groups of the pelecypod family Corbulidae. *Bull. 5, Amer. Mus. Nat. Hist.*, New York, pp. 1-32, 4 pls.

Superfamily Gastrochaenacea

Family Gastrochaenidae (Rock-borers). Genus: *Gastrochaena* Spengler, 1783.

Superfamily Hiatellacea

Family Hiatellidae (Saxicave clams). Genera: *Hiatella* Bosc, 1801; *Cyrtodaria* Reuss, 1801; *Panomya* Gray, 1857; *Panopea* Menard, 1807.

Lamy, E. 1924. Revision des Saxicavidae vivants du Museum National d'Histoire Naturelle de Paris. *Jour. de Conchyl.*, vol. 68, pp. 218-248.

Nesis, K. N. 1965. Ecology of *Cyrtodaria siliqua* and history of the genus *Cyrtodaria* (Bivalvia: Hiatellidae). *Malacologia*, vol. 3, pp. 197-210.

Robertson, R. 1963. Bathymetric and geographic distribution of *Panopea bitruncata*. *Nautilus*, vol. 76, pp. 75-82.

Superfamily Pholadacea

Family Pholadidae (Angel Wings; Piddocks). Genera: *Pholas* Linné, 1758; *Barnea* Leach, 1826; *Cyrtopleura* Tryon, 1862; *Martesia* Sowerby, 1824; *Zirfaea* Leach, 1842.

Turner, R. D. 1954. The family Pholadidae in the western Atlantic and the eastern Pacific Part I—Pholadinae. *Johnsonia*, vol. 3, no. 33, pp. 1-63, illus. Part II, vol. 3, no. 34 (1955).

Family Teredinidae (Shipworms). Genera: *Teredo* Linné, 1758; *Bankia* Gray, 1842.

Clench, W. J., & Turner, R. D. 1946. The genus *Bankia* in the western Atlantic. *Johnsonia*, vol. 2, no. 19, pp. 1-28, illus.

Turner, R. D. 1966. A survey and illustrated catalogue of the Teredinidae. *Mus. Comp. Zool. Harvard*, 265 pp., 64 pls.

Subclass Anomalodesmata
Order Pholadomyoida

Family Pholadomyidae. Genus: *Pholadomya* Sowerby, 1823.

Superfamily Pandoracea

Family Pandoridae (Pandora clams). Genus: *Pandora* Bruguière, 1797.

Boss, K. J., & Merrill, A. S. 1955. The family Pandoridae in the western Atlantic. *Johnsonia*, vol. 4, No. 44, pp. 181-215, illus.

Families Cleidothaeridae,* Laternulidae (*Laternula* Röding, 1798); **Lyonsiidae** (*Lyonsia* Turton, 1822); **Myochamidae** (*Myochama* Stutchbury, 1830); **Periplomatidae** (Genus *Periploma* Schumacher, 1817); **Thraciidae** (*Thracia* Sowerby, 1823).

Lamy, Ed. 1925. Revision des Lyonsiidae vivants. *Jour. de Conchyl.*, vol. 72, pp. 237-313.

Lamy, Ed. 1932. Revision des Thraciidae vivants. *Jour. de Conchyl.*, vol. 75, pp. 213 and 285.

Lamy, Ed. 1932. Revisions des Periplomatidae vivants. *Jour. de Conchyl.*, vol. 75, p. 303.

Superfamily Poromyacea
 (Septibranch clams)

Families Poromyidae (*Poromya* Forbes, 1844); **Cuspidariidae** (Dipper clams, *Cuspidaria* Nardo, 1840); **Verticordiidae** (*Verticordia* Sowerby, 1844).

Bernard, F. R. 1974. Septibranchs of the eastern Pacific (Bivalvia: Anomalodesmata). *Allan Hancock Monogr. Marine Biol.*, No. 8, pp. 1-279.

Superfamily Clavagellacea
 (Watering Pot clams)

Family Clavagellidae. Genera: *Clavagella* Lamarck, 1818; *Brechites* Guettard, 1770; *Penicillus* Bruguière, 1789.

Smith, Brian J. 1971. A revision of the family Clavagellidae from Australia, with descriptions of two new species. *Jour. Mal. Soc. Australia*, vol. 2, pp. 135-161.

Class Cephalopoda
 (Squid, Octopus, Nautilus)

Donovan, D. T. 1964. Cephalopod Phylogeny and classification. *Biol. Reviews*, vol. 39, pp. 259-287.

Lane, Frank W. 1960. *Kingdom of the Octopus*. Sheridan House, N.Y.

Subclass Tetrabranchiata
 (Chambered Nautilus)

Family Nautilidae. Genus: *Nautilus* Linné, 1758.

Hamada, T., et al. 1980. *Nautilus macromphalus* in captivity. *Tokai Univ. Press*, Japan. 80 pp., color illus.

Stenzel, H. B. 1964. Living Nautilus. In: R. C. Moore's *Treatise on Invertebrate Paleontology*, Part K, Mollusca 3, pp. 59-93.

Subclass Dibranchiata
 (Squid and Octopus)

Voss, G. L. 1956. A review of the cephalopods of the Gulf of Mexico. *Bull. Mar. Sci.*, vol. 6, pp. 85-178.

Order Teuthoidea

Family Loliginidae (Arrow Squids). Genera: *Loligo* Schneider, 1784; *Doryteuthis* Naef, 1912; *Architeuthis* Steenstrup, 1857, and others.

Order Sepioidea

Family Spirulidae (Ram's Horn shell). *Spirula* Lamarck, 1801.
Family Sepiidae (Cuttlefish Bones). Genus: *Sepia* Linné, 1758, and other families.

Order Octopoda

Superfamily Argonautoidae

Family Argonautidae (Paper Nautilus). Genus: *Argonauta* Linné, 1758.

Young, J. Z. 1960. Observations on *Argonauta* and especially its method of feeding. *Proc. Zool. Soc. London*, vol. 133, pp. 471-479, 2 figs., 2 pls.

Superfamily Octopodoidea

Family Octopodidae (Octopus). Genus: *Octopus* Lamarck, 1799, and other families.

REGIONAL BOOKS

We are listing here the major semi-popular and scientific faunal works on the mollusks of various major regions. We recommend them for your library shelf, since they usually give detailed descriptions, synonymies and biological information about local species, particularly the smaller ones. Many thousands of smaller faunal papers are listed in the *Zoological Record* (London).

Western Atlantic (East Canada to Caribbean to east South America; Bermuda).

- Abbott, R. T. 1974. *American Seashells*, Marine Mollusks of the Atlantic and Pacific Coasts of North America. 2nd ed. 663 pls., 6,500 species, about 3,000 illustrated.
- Abbott, R. T. 1958. *The Marine Mollusks of Grand Cayman Island*, British West Indies. Monograph II, Acad. Nat. Sci., Philadelphia, 138 pp.
- Abbott, R. T. 1968. *Sea Shells of North America*. 280 pp., 850 species in color, with biology. Golden Press, New York.
- Altena, C. O. Van R. 1969-75. *The Marine Mollusca of Surinam (Dutch Guiana)*. Parts 1 to 3, Rijksmus. Nat. Hist. Leiden.
- Andrews, Jean. 1977. *Shells and Shores of Texas*. 365 pp. Univ. of Texas Press, Austin.
- Bousfield, E. L. 1960. *Canadian Atlantic Shells*. 72 pp. National Museum of Canada, Ottawa. Also a French edition.
- Perry, Louise M., & Schwengel, Jeanne S. 1955. *Marine Shells of the Western Coast of Florida*. 318 pp., 55 pls. and frontispiece. Paleontological Research Institution, Ithaca, New York.
- Rios, E. C. 1975. *Brazilian Marine Mollusks Iconography*. 331 pp., 91 pls. Museu Oceanografico do Rio Grande, Rio Grande, Brazil.
- Warmke, G. L., & Abbott, R. T. 1961. *Caribbean Seashells*. 348 pp. Livingston Press, Narberth, Pennsylvania, also Dover Publications, New York.

Eastern Atlantic (Western Europe; Mediterranean; West Africa).

- Arrecros, J. 1971. *Coquillages Marins*. 64 pp., many illustrations in color. Editions Payot, Lausanne. Mediterranean and N.E. Atlantic shells.
- Bouchet, Ph., Danrigal F., & Huyghens, C. 1979. *Sea Shells of Western Europe*. 144 pp., color illus. American Malacologists, Inc., Melbourne, Florida. (Coquillages des Cotes Atlantique et de la Manche).
- Burnay, Luis Pisani, & Monteiro, Antonio Antunes. 1977. *Seashells from Cape Verde Islands* (I). 88 pp., monochrome photos. Privately published. Lisbon. Partial survey of gastropods of Cape Verde.
- McMillan, Nora F. 1968. *British Shells*. 12 + 196 pp., 80 pls. (32 in color). Warne, London, New York.
- Möller Christensen, J., & Dance, S. Peter. 1980. *Seashells. Bivalves of the British and Northern European Seas*. 124 pp., color illus. Penguin Books, Harmondsworth.
- Nicklés, Maurice. 1950. *Mollusques Testacés Marins de la Côte Occidentale d'Afrique*. 269 pp., text illustrations. Lechevalier, Paris.
- Nordsieck, Fritz. 1968. *Die europäischen Meeres-Gehäuseschnecken (Prosobranchia)*. 8 + 273 pp., 35 pls. (4 in color). Fischer, Stuttgart. First of 3 volumes on mollusks of European waters.
- Nordsieck, Fritz. 1969. *Die europäischen Meeresmuscheln (Bivalvia)*. 8 + 256 pp., 27 pls. (2 in color). Fischer, Stuttgart. Includes species from Black Sea.
- Nordsieck, Fritz. 1972. *Die europäischen Meeresschnecken (Opisthobranchia mit Pyramidellidae; Rissoacea)*. 13 + 327 pp., 41 pls. (4 in color). Fischer, Stuttgart. Includes numerous new species.
- Parenzan, Pietro. 1970-76. *Carta d'Identita delle Conchiglie del Mediterraneo*. 3 vols. (Vol. 1 Gasteropodi, 283 pp., 53 pls., vol. 2 (in 2 parts) Bivalvi, 546 pp., 79 pls.) Bios Taras. Taranto. Particularly good line illustrations.
- Tebble, Norman. 1966. *British Bivalve Seashells*. 212 pp., text illustrations and 12 pls., mostly in color. British Museum (Natural History). London. Very detailed descriptions and good figures.

Indo-Pacific (Hawaii, South Seas, Indian Ocean, Japan).

- Brost, F. B., & Coale, R. D. 1971. *A Guide to Shell Collecting in the Kwajalein Atoll*. 12 + 157 pp., 28 pls. Tuttle, Rutland. Ecological and descriptive account of about 200 species.
- Cernohorsky, Walter O. 1971. *Marine Shells of the Pacific*. 248 pp., text illustrations, 60 pls. Pacific Publications. Sydney. Revised edition of the first of 3 volumes published to date.
- Cernohorsky, Walter O. 1972. *Marine Shells of the Pacific*. Volume 2. 411 pp., text illustrations, 68 pls. (4 in color). Pacific Publications. Sydney.
- Cernohorsky, Walter O. 1978. *Tropical Pacific Marine Shells*. 352 pp., text illustrations, 68 pls. (4 in color). Pacific Publications, Sydney, Australia. Virtually a continuation of the above title.
- Habe, T. 1971. *Shells of Japan*. 139 pp., text illustrations and colored pls. Hoikusha. Osaka. Attractively illustrated pocket guide.

- Habe, T., & Ito, K. 1965. *Shells of the World in Colour*. Vol. 1, The Northern Pacific. 9 + 176 pp., 56 pls., mostly in color. Hoikusha. Osaka. Text in Japanese, names in scientific Latin or English.
- Habe, T., & Kosuge, S. 1966. *Shells of the World in Colour*. Vol. 2, The Tropical Pacific. 9 + 193 pp., 68 color pls. Hoikusha. Osaka. Text in Japanese, names in scientific Latin or English.
- Hinton, A. G. 1972. *Shells of New Guinea and the Central Indo-Pacific*. 18 + 94 pp., 44 color pls. Jacaranda Press & Robert Brown & Associates Pty Ltd., Port Moresby, Melbourne. Particularly useful for Papua New Guinea.
- Hornell, James. 1951. *Indian Molluscs*. 96 pp., text illustrations and a color pl. Bombay Natural History Society. Bombay. A popular handbook.
- Iredale, T., & McMichael, D. F. 1962. *A Reference List of the Marine Mollusca of New South Wales*. Memoir 11, Australian Mus., pp. 1-109.
- Kay, E. Alison. 1979. *Hawaiian Marine Shells*. 653 pp., B. P. Bishop Museum Special Publication 64 (4). Major treatment.
- Kira, Tetsuaki, & Habe, Tasashige. 1962-64. *Shells of the Western Pacific in Color*. Vol 1 (by Kira), 224 pp., 72 color pls., vol 2 (by Habe), 233 pp., 66 color pls. Hoikusha. Osaka.
- Kuroda, T., & Habe, T. 1952. *Checklist and Bibliography of the Recent Mollusca of Japan*. 210 pp. Tokyo.
- Kuroda, T., Habe, T., & Oyama, K. 1971. *The Sea Shells of Sagami Bay*. 489 + 51 pp., illus. Maruzen Co., Tokyo.
- Salvat, Bernard, & Rives, Claude. 1975. *Coquillages de Polynesie*. 391 pp., illustrated throughout in color. Les Editions du Pacifique. Papeete.
- Spry, J. F. 1964. *The Sea Shells of Dar es Salaam*. Part 1—Pelecypoda (Bivalves). 41 pp., 8 pls. (4 in color). Part 2—Gastropods (1968). Tanzania Society. Dar es Salaam.

South Africa.

- Barnard, K. H. 1958, 1959, 1963. Contributions to the knowledge of South African Marine Mollusca. Parts 2 and 3. *Annals South African Museum*, vols. 44, 45 and 47. Technical coverage of prosobranch gastropods.
- Kennelly, D. H. 1969. *Marine Shells of Southern Africa*. 5 + 123 pp., 46 monochrome pls. and 2 color pls. Books of Africa (Pty) Ltd. Cape Town. Has useful locality information.
- Kensley, Brian. 1973. *Sea-shells of Southern Africa. Gastropods*. 236 pp., text illustrations, some in color. Maskew Miller. Cape Town. A useful if rather uncritical survey.

Australasia (Australia, New Zealand).

- Allan, Joyce. 1959. *Australian Shells*. 21 + 487 pp., text illustrations and 44 pls., some in color. Georgian House, Melbourne. Revised edition of an excellent popular book.
- Coleman, Neville. 1975. *What Shell is That?* 308 pp., illustrated throughout in color. Hamlyn, Sydney, London, etc. Beautifully illustrated survey emphasizing interest of living mollusks in natural habitats.
- Cotton, Bernard C. 1959. *South Australian Mollusca. Archaeogastropoda*. 449 pp., text illustrations and color frontispiece. Handbooks of the Flora and Fauna of South Australia. Adelaide. No further volumes on the gastropods have been published.
- Cotton, Bernard C. 1961. *South Australian Mollusca. Pelecypoda*. 363 pp., text illustrations. Handbooks of the Flora and Fauna of South Australia. Adelaide. A revision of a work first published in 1938.
- Cotton, Bernard C. 1964. *South Australian Mollusca. Chitons*. 151 pp., text illustrations and color frontispiece. Handbooks of the Flora and Fauna of South Australia. Adelaide. Authoritative.
- Macpherson, J. Hope, & Gabriel, C. J. 1962. *Marine Molluscs of Victoria*. 15 + 475 pp., text illustrations. Melbourne University Press. A well-documented survey for beginners and advanced students alike.
- May, W. L., & Macpherson, J. Hope. 1958. *An Illustrated Index of Tasmanian Shells*. Tasmanian Government, Hobart. A collection of reduced but adequate figures of all Tasmanian species.
- Powell, A. W. B. 1979. *New Zealand Mollusca, Marine, Land and Freshwater Shells*. 500 pp., 82 pls. Wm Collins, Ltd.
- Wilson, B. R., & Gillett, Keith. 1971. *Australian Shells*. 168 pp., text illustrations and 106 color pls. Tuttle, Rutland & Tokyo. Exquisite photos, marine gastropods only.

Eastern Pacific.

- Abbott, R. Tucker. 1974. *American Seashells*. 2nd ed., 663 pp., 6,500 species, about 3,000 illustrated.
- Keen, A. Myra. 1971. *Sea Shells of Tropical West America*. 14 + 1,064 pp., fully illustrated in monochrome and color. Stanford University Press, Stanford. A mammoth regional fauna unique in molluscan literature.
- McLean, James H. 1969. *Marine Shells of Southern California*. 104 pp., illustrated. Los Angeles County Museum of Natural History, Science Series 24, Zoology No. 11. Excellent for the serious collector.
- Olsson, Axel A. 1961. *Mollusks of the Tropical Eastern Pacific*. Panamic-Pacific Pelecypoda. 574 pp., 86 pls. Paleontological Research Inst., Ithaca, N. Y. Well illustrated and with many new species described.

INDEX TO POPULAR NAMES

- Abalones, 19
- Almond Arks, 294
- Amoria Volutes, 220
- Anapella Clam, 338
- Angel Wing, 372
- Ancillas, 194
- Arctica Clams, 351
- Argonauts, 376
- Ark Clams, 291
- Asian Clam (*Corbicula*), 352
- Astartes, 325
- Augers
 - Deepsea, 56
 - True, 273
- Australian Trumpet, 176, 378
- Awning Clams, 289

- Babylons, 173
- Baler Shells (*Volutes*), 215
- Batissa Clam, 352
- Bean Clams (*Donax*), 345
- Bell Clapper (*Campanile*), 68
- Bittersweet Clams, 295
- Bivalves, 289
- Bleeding Tooth (*Nerite*), 52
- Bolmas, 49
- Bonnets (*Phalium*), 111
- Brachiopods, 378
- Brooch Clams (*Neotrigonia*), 320
- Button Tops (*Umboniums*), 43
- Bubble Shells, 279

- Caecums, 58
- Calliostoma Tops, 34
- Calypto Clam, 351
- Cameo Shells, 111
- Canoe-bubble, 279
- Cap Shells, 72
- Carditas, 324
- Carrier Shells, 73
- Cassidulas, 281
- Cephalopods, 376
- Ceriths, 61
- Chambered Nautilus, 377
- Chunks, 210
- Chitons, 284
- Clams
 - Anapella, 338
 - Awning, 289
 - Bean (*Donax*), 345
 - Diplodon, 322
 - Gari, 346
 - Giant (*Tridacna*), 333
 - Hard-shell, 368
 - Lantern, 372
 - Mactra, 333
 - Myadora, 373
- Clanculus Tops, 43
- Coat-of-Mail Shells (*Chitons*), 284
- Cockles, 326
- Cock's-comb Oyster, 318
- Conchs
 - Busycon, 176
 - Crown, 175
 - Fighting, 77
 - Horse, 182
 - Swamp (*Melongena*), 175
 - True (*Strombus*), 73
- Cones, 244
- Coquinas, 345
- Coral-shells, 155
- Corbula Clams, 369
- Cowries, 83
- Crown Conch, 175
- Cup-and-Saucer Shells, 72
- Cuspidarias, 374
- Cuttlefish, 376
- Cyphomas, 99

- Date Mussels, 299
- Delphinulas, 51
- Diplodon Clams, 322
- Distorsios, 126
- Dogwinkles, 145
- Donax Clams, 345
- Dosinias, 360
- Dove Shells, 159
- Drills (*Muricidae*), 144
- Drupes
 - Thorn, 149
 - True, 150
- Dwarf Tritons, 173

- Ear Moons (*Sinum*), 103
- Egg Shells (*Ovulas*), 99
- Elephant Tusk, 282
- Emarginulas, 24
- Enginas, 169

- False Oyster (*Cleidotherus*), 373
- False Tuns, 116
- Fig Shells, 116
- Fighting Conchs, 77

- File Clams (*Lima*), 318
- Flamingo Tongue, 100
- Frog Shells (*Bursas*), 127

- Gari Clams, 346
- Gazas, 40
- Geoduck, 371
- Giant Clams, 333
- Gibbulars, 42
- Glassy Nautilus, 101
- Glory-of-the-Seas Cone, 246
- Goblets (*Cantharus*), 171
- Golden Cowrie, 96
- Goeyduck (*Geoduck*), 371
- Grinning Tun, 117

- Hairy-shells (*Trichotropids*), 71
- Harpas, 211
- Helmets, 110
- Hoof-shells, 71
- Horn Snails, 63
- Horse Conchs, 182

- Jackknife Clams (*Solen*), 338
- Janthinas, 70
- Jewel Boxes (*Chamas*), 323
- Jingle Shells (*Anomia*), 317
- Junonia, 223

- Keyhole Limpets, 24
- Kitten Paws (*Plicatulas*), 315

- Lamellarias, 83
- Land snails (*Melampus*), 281
- Lantern Clams, 372
- Latiaxis, 153
- Latirus, 183
- Lightning Whelk, 176
- Limpets
 - False, 281
 - Fleshy, 26
 - Keyhole, 24
 - Slot, 27
 - True (*Patella*), 29
- Lion's Paw, 309
- Lucina Clams, 320
- Lyonsia Clams, 373

- Macoma, 344
- Mactra Clams, 333
- Mahogany Clam, 347
- Margarite Tops, 32, 35
- Marginellas, 231
- Marlinspike, 273
- Marsh Clam (*Polymesoda*), 352
- Maureas, 40
- Melongenas, 175
- Melon Volutes, 216, 378

- Miniature Melo, 279
- Miters (Mitres), 195
- Modulus Snails, 62
- Money Cowrie, 87
- Monodonts, 41
- Moon Snails, 101
- Morums, 115
- Murex Shells, 129
- Mussels
 - Date, 299
 - Edible, 297
 - Zebra, 351
- Myadora Clam, 373
- Nassa Mud Snails, 177
- Nautilus
 - Chambered, 377
 - Glassy (Carinaria), 101
 - Paper, 376
- Neptunes, 162
- Nerites, 52
- Norris Shell, 43
- Nut Clams, 289
- Nutmegs, 225
- Ocean Quahog, 351
- Octopus, 377
- Olives
 - Dwarf, 193
 - True, 189
- Ormers, 19
- Ostrich-foot, 75
- Otter Clams (Lutraria), 336
- Ovulas, 99
- Oxheart Clam, 351
- Oysters
 - Edible, 318
 - False, 373
 - Hammer, 302
 - Pearl, 301
 - Thorny, 316
 - Tree, 302
 - Winged, 301
- Pagoda Shells, 158
- Pandoras, 372
- Panopeas, 371
- Paper Nautilus, 376
- Pearl Oysters, 301
- Pelecypods, 289
- Pelican's-foot, 75
- Pen Shells, 299
- Peristernias, 186
- Periwinkles, 56
- Pheasant Shells, 52
- Pholads, 371
- Phos Shells, 168
- Piddocks, 371
- Pipi Clam (New Zealand), 337
- Pisanias, 170
- Planaxis Snails, 62
- Pleurotomarias, 18
- Pteropods, 280
- Pulmonates, 281
- Puncturellas, 25
- Purple Sea Snails, 70
- Purpuras, 142, 146
- Pyrams, 277
- Pythia Snails, 282
- Quahogs, 368
- Rangias, 336
- Rapa Snails, 157
- Razor Clams, 338
- Risso Snails, 58
- Rock-borer Clams, 370
- Rock-shells (Thais), 145
- Saddle Oyster, 317
- Sanguin Clams, 346, 348
- Scallops, 303
- Sea Ears (Haliotis), 19
- Semele Clams, 349
- Separatistas, 71
- Shield Limpets, 24
- Siliqua Clams, 339
- Simnias, 100
- Slipper Shells, 72
- Slit Shells, 18
- Slot Limpets, 27
- Snipe's Bill Murex, 129
- Soft-shell Clams, 369
- Solecurtus Clams, 347
- Spider Conchs, 81
- Spindles, 187
- Spirula, 377
- Spoon Clams, 373
- Squids, 376
- Star-shells, 50
- Stomatellas, 44
- Strombinas, 159
- Sundials, 61
- Sunrise Tellin, 340
- Sunset Clam, 348
- Tegulas, 42
- Tellins, 340
- Tibias, 82
- Thorn Drupes, 149
- Thracia Clams, 374
- Titiko (Amphibola), 281
- Toheroa Clam (New Zealand), 338
- Top Shells, 32, 45
- Trapezium Clams, 351
- Tridacnas, 333
- Tritons, 119
- Trivias, 83
- Trochita Shell, 73
- Trophons, 151
- Trumpet
 - Australian, 176
 - Triton's, 119
- Tudiculas, 210
- Tugalias, 24
- Tulips, 183
- Tuns
 - False, 116
 - True, 118
- Turbans, 45
- Turrids, 237
- Turritellas, 58
- Tusk Shells, 282
- Typhis, 157
- Umbrella Shell, 280
- Vase Shells, 208
- Venus Clams, 352
- Venus Comb Murex, 129
- Vertagus, 66
- Verticord Clams, 374
- Vitrinellas, 58
- Volutes, 212
- Volvas, 100
- Watering Pots, 375
- Wentletraps, 68
- Whelks (Buccinids), 162, 174
- Whelks (Busycons), 176
- Windowpane Oyster, 317
- Worm-shells, 61
- Yoldias, 290

INDEX TO SCIENTIFIC NAMES

- abacophora, Mitra, 197
 abbas, Conus, 245
 abbotti, Conus, 268
 abbreviata, Coralliophila, 156
 abbreviata, Panopea, 371
 abbreviatum, Cirsotrema, 69
 abbreviatus, Conus, 260
 abbreviatus, Planaxis, 62
 aberrans, Coralliophila, 156
 abildgaardiana, Gastrana, 343
 abnormis, Latirus, 185
 abrolhosensis, Collisella, 32
 abyssicola, Nassarius, 181
 abyssicola, Volutocorbis, 212
 ABYSSOCHRYSIDAE, 56
 Abyssochrysis, 56
 abyssorum, Pseudastrium, 49
 Acanthina, 148
 Acanthocardia, 326–327
 Acanthochitona, 287
 acanthodes, Aequipecten, 309
 acanthodes, Trophonopsis, 151
 Acanthopleura, 287
 acanthopterus, Pteryonotus, 140
 acanthostephes, Murex, 129
 Acanthotrophon, 153
 acapulcana, Trajana, 167
 accola, Marginella, 235
 Acesta, 319–320
 achates, Terebra, 273
 achatidea, Cypraea, 87
 achatina, Mactra, 334
 achatinus, Callochiton, 286
 achatinus, Conus, 256
 acicularia, Simnia, 100
 acicularis, Cypraea spurca, 85
 Acila, 289–290
 acinaces, Zenatia, 337
 acinonyx, Natica, 106
 Acmaea, 33
 ACMAEIDAE, 32–33
 Acreuciroa, 375
 Acteon, 278
 aculeata, Acanthocardia, 326
 aculeata, Guildfordia, 49
 aculeata, Thais, 147
 aculeatum, Biplex, 124
 aculeatum, Calliostoma, 40
 aculeatus, Chicoreus, 137
 aculeiformis, Conus, 252
 acuminata, Agaronia, 196
 acuminata, Ancilla, 195
 acuminata, Cancellaria, 227
 acuminata, Mitra, 201
 acuminata, Nassaria, 167
 acuminatum, Epitonium, 69
 acuminatus, Conus, 246
 acuminatus, Latirus, 184
 acupictum, Vexillum, 206
 acus, Pyramidella, 277
 acuta, Lophiotoma, 238
 acuta, Mopalia, 286
 acuta, Nuculana, 291
 acutangula, Turritella, 60
 acuticostata, Verticordia, 375
 acutidens, Azorinus, 349
 acutissima, Acutitectonica, 62
 acutus, Tectus, 45
 adairense, Cymatium gibbosum, 121
 adamsi, Hiattula, 347
 adamsonii, Conus, 247
 Adamussium, 303
 adansonii, Marginella, 231
 adansonii, Natica, 106
 adansoniana, Pleurotomaria, 19
 adansonii, Cypraea, 97
 adansonii, Tagelus, 349
 adcocki, Paramoria, 221
 adcocki, Phalium, 113
 adela, Calliostoma, 37
 adela, Cancellaria reticulata, 225
 Adelomelon, 218
 adelphicus, Japelon, 164
 Admetula, 228
 adonis, Conus, 262
 adriatica, Aperiuvula, 99
 adspersa, Cominella, 169
 adspersa, Natica, 107
 adspersa, Tapes, 362
 adspersum, Calliostoma, 38
 Adula, 298
 adunca, Pteropurpura, 142
 aduncospinosus, Murex, 130
 aduncus, Clypeomorus, 68
 adusta, Cypraea onyx, 88
 adusta, Mitra, 198
 adustum, Cerithium, 67
 adustus, Chicoreus, 137
 adustus, Conus, 258
 advertex, Conus, 250
 aegyptiaca, Gibbula, 42
 aemulus, Conus, 265, 267
 aenea, Nacella, 31
 Aeneator, 168
 aenigmatica, Enigmonia, 317
 aeola, Bathybembix, 35
 aeolicum, Lyrocardium, 331
 aequilatera, Gomphina, 364
 aequilateralis, Spisula, 336
 aequinoctialis, Cypraea, 87
 Aequipecten, 306–310, 312
 aequivoca, Gafrarium, 354
 aerumosa, Mitra, 198
 aethiopica, Melo, 215
 aethiops, Macron, 172
 aethiops, Melagraphia, 42
 Afer, 210
 afer, Afer, 210
 affinis, Calliostoma unicum, 39
 affinis, Carditamera, 324
 affinis, Chicoreus, 136
 affinis, Cypraea, 84
 affinis, Tagelus, 349
 affinis, Terebra, 275
 Aforia, 240
 africana, Cabestana, 125
 africana, Phalium, 113
 africana, Pleurotomaria, 18
 africanus, Megatebennus, 27
 Afrivolula, 231
 afrobellatus, Strombus terebellatus, 78
 Agaronia, 196
 Agatrix, 229
 agrestis, Conus, 250
 Agriopoma, 359
 aguayoi, Siratus, 132
 aguayoi, Volutifusus, 223
 ajar, Cardita, 325
 Akera, 280
 alabaster, Conus, 263
 alabaster, Siratus, 134
 alabasteroides, Conus, 252
 alapapilionis, Natica, 109
 alapapilionis, Paphia, 364
 alarconi, Miomelon, 219
 alaskana, Cyclocardia, 325
 alaskana, Volutomitra, 225
 alaskanus, Boreotrophon, 152
 alata, Mactrellona, 335
 alata, Stenoplax, 285
 alatus, Isognomon, 302
 alatus, Pteryonotus, 140
 alatus, Strombus, 77
 alba, Anodontia, 321
 alba, Patella, 29
 albescens, Nassarius, 181
 albicans, Haliotis, 22
 albicans, Pecten, 305
 albicilla, Nerita, 54
 albida, Cancellaria, 227
 albida, Chlamys hastata, 314
 albida, Gibbula, 41
 albida, Plaxiphora, 286
 albida, Polystira, 239
 albidus, Cleidothaerus, 373
 albidus, Phaxas, 339
 albidus, Pitar, 356
 albinella, Tellina, 341
 albinus, Fusinus, 188
 albolineata, Chlamys, 314
 albolineata, Glycymeris, 296
 albolineatus, Chiton, 288
 albuginosa, Cypraea, 85
 albumen, Neverita, 102
 albus, Malleus, 302
 albus, Solecurtus, 348
 albus, Strombus gibberulus, 81
 Alcithoe, 220
 alcocki, Oocorys, 115
 alcocki, Propeamussium, 303
 alderi, Euspira, 103
 aldrovandi, Panopea, 371
 alesidota, Hindsiclava, 241
 aleutica, Natica, 108
 alfredensis, Colubraria, 173
 alfredensis, Pleuroploca, 183
 alga, Cypraea mappa, 96
 algicola, Cerithium, 65
 algoensis, Conus, 266
 alli, Cryptopecten, 308
 allium, Tonna, 118
 allyni, Fusinus, 188
 Alora, 70
 alternata, Diodora, 25
 alternata, Siphonaria, 281
 alternata, Tellina, 341
 alternatus, Pitar circinatus, 357
 alternidentata, Tellina, 342
 alticostata, Patelloida, 33
 altispira, Cymbiola, 217
 altispiratus, Conus, 266
 Altivasm, 210
 aluco, Pseudovertagus, 67
 alveolata, Engina, 169
 alveolata, Terebra, 276
 alveolus, Cerithium, 65
 alveolus, Conus, 262
 amabilis, Cypraea, 89
 amabilis, Paphia, 364
 amabilis, Pleurotomaria, 18
 amadis, Conus, 247
 Amaea, 68–69
 amakusana, Scalptia, 230
 Amalda, 194–196
 amanda, Vexillum, 208
 amandi, Chlamys, 313
 amasia, Scalptia, 226
 amatheia, Pilsbryspira, 243
 Amauropis, 105
 amazonica, Calliostoma, 38
 ambigua, Mitra, 197
 ambiguus, Conus, 266
 ambiguus, Scutus, 24
 ambiguus, Zeatrophon, 153
 Amblychilepas, 27
 ambustus, Fusinus, 188
 americana, Astraea tecta, 50
 americana, Glycymeris, 297
 americana, Odontocymbiola, 219
 americanus, Aulacomya, 297
 americanus, Modiolus, 299
 americanus, Spondylus, 316
 Anacardina, 329
 amethystina, Oliva annulata, 191
 Amiantis, 357
 amictodeum, Cymatium amictum, 121
 amictum, Cymatium, 121
 amiculum, Decatopecten, 307
 ammiralis, Conus, 246
 amoeba, Cypraea, 92
 Amoria, 222
 amosi, Metula, 171
 amouretta, Harpa, 211
 Amphibola, 281
 amphirugus, Conus, 268
 ampla, Amalda, 195
 ampicostatus, Argopecten irradians, 310
 amplustre, Aplustrum, 279
 amplustris, Latirus, 184
 Ampulla, 224
 ampulla, Bulla, 279
 ampullacea, Volutharpa, 175
 ampullifera, Polinices, 105
 Amusium, 303–304
 amygdala, Cronia, 146
 amygdala, Marginella, 232
 amygdalumtostum, Barbatia, 293
 anacanthus, Spondylus, 316
 Anachis, 160–161
 anactor, Turritella, 60
 Anadara, 292–293
 anadema, Conus, 251
 Anapella, 338
 anatellus, Strombus, 77
 Anatina, 337
 anatina, Anatina, 337
 anatina, Laternula, 372
 anatina, Tugonia, 369
 anatinus, Scutus, 24
 anatomica, Homalocantha, 139
 anceps, Conus, 254
 anceyi, Cypraea, 88
 ancile, Haliotis, 23
 Ancilla, 195–196
 ancilla, Adelomelon, 218
 Ancillista, 194
 Ancistrolepis, 164
 anemone, Conus, 258
 Angaria, 51
 angasi, Amoria, 222
 angasi, Conus, 257
 angasi, Loricella, 287
 angasi, Periploma, 374
 angasi, Phenacovolva, 101
 angasi, Prototyphus, 157
 angioyna, Cypraea, 95
 Anguipecten, 312
 angularis, Hexaplex, 135
 angularis, Strombina, 159
 angulata, Minolia, 34
 angulata, Modulus, 63
 angulata, Stomatolina, 44
 angulata, Turbinella, 210
 angulata, Zidona, 218
 angulatum, Trachycardium, 328
 angulatum, Trapezium, 351
 angulatus, Tagelus, 349
 angulifera, Littorina scabra, 57
 anguliferus, Chicoreus, 135
 anguliferus, Umbonium, 43
 angulosa, Oliva, 99
 angulosa, Tellina, 341
 angulosa, Vexillum, 207
 angulosum, Buccinum, 174
 angusta, Fissurella, 27
 angustata, Cypraea, 90
 angustata, Marginella, 236
 anna, Lyria, 214
 Annachlamys, 306
 annae, Dosinia, 361
 annae, Fulvia, 331
 annandalei, Naquetia, 133
 annettae, Cypraea, 87
 annettae, Lophocardium, 330
 annotata, Agaronia, 196
 annulata, Bullia, 177
 annulata, Cypraea, 83
 annulata, Oliva, 191
 annulatum, Calliostoma, 36
 annulatum, Epitonium, 69
 annulosus, Brechites, 375
 annulus, Cypraea, 87
 Anodontia, 321
 anomaliae, Homalocantha, 139
 Anomalocardia, 366–367
 Anomia, 317
 ANOMIIDAE, 317
 ansonae, Marginella, 235
 antarctica, Neotrigonia, 320
 antarctica, Panopea, 371
 antelia, Cypraea, 96
 Antigona, 353
 antillarum, Collisella, 32, 33
 antillarum, Eucrassatella, 326
 antillarum, Lithophaga, 299
 antillarum, Lyropecten, 315
 antillarum, Murex, 132
 antillensis, Mitra swainsoni, 199
 Antillophos, 167
 Antiplanes, 239
 antipodes, Scutus, 24
 antiqua, Neptunea, 164
 antiquata, Anadara, 292
 antiquata, Mactra, 334
 antiquata, Nerita polita, 53
 antiquata, Trigonostoma, 229
 antiquatus, Magilus, 156
 antonii, Natica, 107
 anus, Distorsio, 126
 anus, Dosinia, 361
 anxiar, Cancellaria, 226
 aoteanus, Nassarius, 178
 Aperiuvula, 99
 aperta, Fissurellidea, 27
 aperta, Fulvia, 331
 aperta, Trivia, 83
 apertura, Diodora, 25
 Apha, 230
 aphrodina, Katelaysia scalarina, 363
 aphrodite, Conus, 251
 apicina, Marginella, 234
 apiculata, Chaetopleura, 286
 aplustre, Conus, 257
 aplustre, Latirus, 184
 Aplustrum, 279
 apogrammatos, Conus princeps, 271
 APORRHAIIDAE, 75
 Aporrhais, 75

- appendiculata, Lithophaga, 299
 Appisania, 171
 approximata, Terebra, 275
 aprinum, Dentalium, 283
 aquaria, Brechites, 375
 aquatile, Cymatium pileare, 120
 aquatilis, Haliotis, 21
 arabica, Alcihoe, 220
 arabica, Cypraea, 97
 arabicula, Cypraea, 88
 arachnoidea, Natica, 109
 arakana, Timoclea, 362
 arakensis, Timoclea, 362
 araneosus, Conus, 244
 arausiaca, Harpulina, 220
 Arca, 291-292
 arcana, Chama, 323
 archeri, Lyria, 213
 Archimediella, 59
 Architectonica, 61-62
 ARCHITECTONICIDAE, 61-62
 archithalassus, Conus ammiralis, 246
 archon, Conus, 271
 ARCIDAE, 291-294
 Arcinella, 324
 arcinella, Arcinella, 324
 arctatum, Mesodesma, 337
 Arctica, 351
 arctica, Hiatella, 370
 ARCTICIDAE, 351
 Arctomelon, 221
 arcuatus, Conus, 272
 arcularius, Nassarius, 178
 arenacea, Neocancilla, 203
 arenaria, Mya, 369
 arenarius, Chicoreus, 137
 arenatus, Conus, 260
 arenosa, Cypraea, 98
 areola, Phalium, 111
 areolata, Babylonia, 173
 areolata, Terebra, 273
 argenteonitens, Bathybembix, 35
 argillaceus, Conus, 262
 argo, Argonauta, 376
 Argobuccinum, 125
 Argonauta, 376
 ARGONAUTIDAE, 376
 Argopecten, 307, 310
 argosysia, Terebra, 277
 argus, Argobuccinum, 125
 argus, Cypraea, 96
 argus, Terebra, 273
 argyrostoma, Turbo, 46
 argyrostomum, Chlorostoma, 42
 ariel, Cellana, 31
 ariomus, Pterochelus, 141
 aristata, Lithophaga, 299
 armadillo, Conus, 252
 armata, Bullia, 177
 armatum, Vasum, 208
 armatus, Latiaxis, 154
 armatus, Latirus, 185
 armeniaca, Cypraea, 88
 armiger, Conus, 270
 armigera, Thais, 148
 armigera, Tudicula, 210
 armillatus, Conus, 269
 artemis, Chicoreus, 137
 arthritica, Lambis chiragra, 82
 arthritica, Neptunea, 165
 articularis, Harpa, 211
 articulata, Conus bullatus, 255
 articulata, Rhinoclavis, 66
 articulatus, Chiton, 288
 articulatus, Phos, 167
 articulatus, Siratus, 132
 artoptus, Conus, 248
 aruanus, Syrinx, 176, 378
 Asaphis, 347
 ascensionis, Nerita, 53
 asellus, Cypraea, 90
 asianus, Chicoreus, 136
 asiaticum, Trachycardium, 330
 asinina, Haliotis, 21
 aspera, Diodora, 25
 aspera, Patella, 29
 aspera, Pecten, 304
 aspera, Rhinoclavis, 66
 asperrima, Chlamys, 309
 aspersa, Papyridea, 329
 aspersus, Eichelus, 34
 asperulata, Chlamys, 313
 assimilis, Cantharus, 171
 assimilis, Donax, 345
 assimilis, Glycymeris, 295
 assimilis, Haliotis, 19
 Astarte, 325-326
 ASTARTIDAE, 325-326
 asterioida, Bolma, 50
 Astraea, 49-51
 astricta, Mitra pellissierpentis, 201
 asturiana, Puncturella, 25
 astyagis, Cancellaria, 202
 Atactodea, 338
 Atalacmea, 33
 atava, Cypraea, 87
 ater, Aulacomya, 297
 ater, Faunus, 64
 aterrima, Nerita, 53
 Atlanta, 101
 atlantica, Casmaria ponderosa, 114
 atlantica, Pleurotomaria, 18
 atlantica, Pteria, 301
 atlanticus, Aequipecten, 310
 atlanticus, Ficus, 117
 ATLANTIDAE, 101
 atlantis, Calliostoma, 38
 atlantis, Columbarium, 158
 atlantis, Scaphella gouldiana, 224
 atra, Nerita, 53
 atramentosa, Nerita, 53
 atratum, Cerithium, 66
 atratus, Eichelus, 34
 Atrina, 300
 atropurpurea, Pinna, 300
 attenuatum, Laevicardium, 332
 attenuatum, Rhinoclavis, 67
 attenuatus, Conus, 268
 attenuatus, Phaxas, 339
 attrahens, Brechites, 375
 Atya, 279
 auaua, Limaria, 319
 augur, Conus, 253
 Aulacomya, 297
 aulaea, Haliotis, 19
 Aulica, 216
 aulica, Cymbiola, 216
 aulicus, Conus, 245
 aurantia, Fulgoraria, 221
 aurantia, Iredalina, 220
 aurantia, Lambis, 81
 aurantia, Marginella, 232
 aurantia, Megapitaria, 359
 aurantia, Mitra, 199
 aurantia, Vexillum, 207
 aurantiaca, Donax, 346
 aurantiaca, Megapitaria, 359
 aurantiaca, Mitra, 199
 aurantia, Bractechlamys, 313
 auranticus, Alтивасum, 210
 aurantium, Cypraea, 96
 aurantius, Conus, 270
 aurantius, Polinices, 105
 aurantius, Spondylus, 316
 auratus, Conus, 245
 aurea, Venerupis, 363
 aureocincta, Latirus, 185
 aureocinctum, Pseudocyphoma, 99
 aureofasciatus, Conus spurius, 267
 aureola, Bolma, 49
 aureolatum, Vexillum, 208
 aureotincta, Tegula, 42
 aureus, Conus, 245
 auricoma, Cerithium, 66
 auricomus, Conus, 246
 auricula, Crucibulum, 73
 auricularia, Dolabella, 280
 auricularia, Olivancillaria vesica, 194
 auriculatum, Clypeolum, 56
 auriculifera, Clavus, 242
 auriculifera, Cucullaea, 294
 auriflua, Glycymeris, 295
 auriscati, Otopleura, 278
 aurisdianae, Strombus, 80
 aurisfelis, Cassidula, 282
 aurisiaca, Marcia, 363
 aurisiacus, Conus, 248
 aurisjudae, Ellobium, 282
 aurismidae, Ellobium, 282
 aurora, Calliostoma, 38
 aurora, Mitra, 200
 austini, Conus, 270
 australasia, Mayena, 124
 australiae, Amusium pleuronectes, 303
 australiensis, Peristernia, 186
 australis, Bulla, 279
 australis, Chlamys, 309, 313
 australis, Clavagella, 375
 australis, Conus, 252
 australis, Diodora, 26
 australis, Fulvia, 331
 australis, Fusinus, 188
 australis, Glycymeris, 296
 australis, Haliotis, 20
 australis, Ischnochiton, 284
 australis, Latiaxis, 154
 australis, Nerita, 53
 australis, Paphies, 337
 australis, Phasianella, 52
 australis, Scutus, 24
 australis, Solemya, 289
 australis, Stomatia, 44
 australis, Strombus, 80
 Austroclavus, 242
 Austrocochlea, 41
 Austrofusus, 166
 Austroharpa, 212
 Austrotrophon, 151, 153
 avellana, Amphibola, 281
 avellana, Arca, 292
 avena, Marginella, 235
 avicula, Pteria, 301
 awajiensis, Argopecten, 310
 awatii, Bursa, 127
 axelrodi, Conus, 263
 axicornis, Chicoreus, 138
 Azorinus, 349
 azumai, Cypraea, 87
 babelica, Basilissa, 34
 Babylonia, 173-174
 babylonia, Terebra, 275
 babylonia, Turris, 239
 baccatus, Eichelus, 34
 bacillum, Cancellaria, 202
 bacini, Neverita, 102
 badia, Mitra, 198
 badia, Pleuroploca, 183
 badius, Conus, 250
 badius, Nassarius, 180
 bairdii, Bathybembix, 35
 bairdii, Calliostoma, 37, 38
 bairdii, Pleurotomella, 241
 bairstowi, Conus, 266
 bairstowi, Marginella, 236
 bajanensis, Conus, 270
 balboae, Cancellaria, 227
 baldwinii, Vexillum, 208
 balloti, Amusium japonicum, 303
 balteata, Niso, 278
 balteatus, Bullia, 177
 balteatus, Conus, 259
 balteatus, Murexiella, 143
 balteatus, Nassarius, 181
 balteus, Conus, 266
 balthica, Macoma, 344
 bandanus, Conus, 244
 bandatum, Phalium bandatum, 111
 Bankivia, 41
 banksii, Chicoreus, 136
 barattinii, Adelomelon, 218
 barbadensis, Conus, 260
 barbadensis, Fissurella, 27
 barbadensis, Mitra, 200
 barbara, Patella, 30
 barbata, Barbatia, 293
 Barbatia, 293
 barbatus, Pilosabia, 72
 barbouri, Oocorys, 116
 barbudensis, Sconsia, 114
 barclayi, Cypraea, 89
 barclayi, Latirus polygonus, 184
 barclayi, Naquetia, 133
 barwelli, Callista, 357
 barnardi, Fusivolula, 223
 Barnea, 371
 barnesii, Lyria, 214
 barthelemyi, Conus, 255
 barthelemyi, Cypraea, 87
 bartletti, Columbarium, 158
 bartschi, Bolma, 49
 bartschi, Conus, 272
 bartschi, Oocorys, 116
 Bartschia, 172
 Baryspira, 195
 basilanica, Limaria, 319
 Basilissa, 34
 Bassina, 367
 Batharca, 294
 Bathybembix, 35
 Bathymophila, 34
 Bathytoma, 241
 Batillaria, 63
 Batissa, 352
 bayeri, Admetula, 228
 bayeri, Glyphostoma, 242
 beana, Entodesma, 373
 beauui, Antillophos, 167
 beauui, Cyclostremiscus, 58
 beauui, Lyria, 213
 beauui, Siratus, 133
 bechei, Nemocardium, 330
 beckii, Adelomelon, 218
 beckii, Cypraea, 84
 beddomei, Conus, 269
 Bedeva, 145
 bednalli, Pterynotus, 140
 bednalli, Volutoconus, 219
 beebai, Trophon, 153
 Beguina, 324
 behringiana, Neptunea ventricosa, 164
 behringii, Beringion, 162
 beieri, Cypraea, 87
 belcheri, Forreria, 151
 belcheri, Latirus, 184
 belcheri, Marginella, 231
 belcheri, Mitra, 200
 bella, Ctena, 321
 bella, Polia, 172
 bellastrata, Semele, 350
 bellegladensis, Murex, 131
 bellus, Murex chrysostoma, 131
 bengalensis, Conus, 246
 Benthovoluta, 225
 bequaerti, Pteropurpura, 141
 berdulinus, Conus, 253
 beringiana, Panomya, 371
 beringii, Pyrolofusus, 162
 Beringion, 162
 bermudensis, Conus, 269
 bermudezi, Columbarium, 158
 bernhardi, Nerita, 54
 bernhardiana, Vexillum, 207
 bertini, Sanguinolaria, 347
 Berylsma, 168
 betsyae, Hastula, 274
 betulinus, Conus, 250
 beyrichii, Pleurotomaria, 18
 bezoar, Rapana, 149
 biangulata, Americardia, 329
 bibbeyi, Marchia, 139
 bicallosa, Cypraea, 84
 bicarinata, Trichotropis, 71
 bicarinatum, Trapezium, 351
 bicolor, Anachis, 160
 bicolor, Cypraea, 90
 bicolor, Isognomon, 302
 bicolor, Nassarius, 181
 bicolor, Phyllonotus, 135
 bicolor, Pinna, 300
 bicolor, Polinices, 102
 bicolor, Scaptila, 229
 biconica, Cronia, 145
 bicostalis, Thais, 148
 bidentatus, Melampus, 281
 bifasciata, Cancellaria, 225
 bifasciata, Marginella, 231, 233
 bifasciatus, Polinices, 103
 bifrons, Equichlamys, 313
 bifurcatus, Septifer, 298
 bigelowi, Calliostoma, 38
 bijubata, Turridrupa, 239
 biliosus, Conus, 259
 bilocularis, Septifer, 298
 bilunulata, Dosinia, 360
 bimaculata, Cypraea, 89
 bimaculatus, Heterodonax, 347
 bimaculatus, Megatebennus, 27
 bimaculosa, Nassarius, 181
 bimarigata, Clavatulata, 241
 bipartita, Ancilla, 196
 bipinnatus, Marchia, 141
 Biplax, 124
 biplicata, Olivella, 193
 biradiata, Hiatula, 348
 biradiatum, Laevicardium, 332
 birostris, Phenacovolva, 100
 biserialis, Thais haemastoma, 147
 bisulcata, Lithophaga, 299
 bisulcatum, Phalium, 112
 bitruncata, Panopea, 371
 bituberculare, Gyrineum, 125
 bitubercularis, Nassaria, 167
 bitubercularis, Thais, 147
 bituberculata, Rhinoclavis, 66
 bituberculatus, Strombus, 76

- bituberculosum, Phalium, 113
bizonalis, Vexillum, 208
blacki, Maurea, 40
blainei, Epitonium, 69
blainvillei, Muricopsis, 144
blainvilliana, Separatista, 71
blanda, Marginella, 232
blanfordi, Thais, 148
bocki, Conus, 263
bodalla, Zemira, 174
bodegensis, Tellina, 342
boeddinghausi, Hiatula, 348
boeticus, Conus, 263
boettgeri, Fusinus, 188
boivinii, Cypraea, 85
bojadorensis, Murexiella, 137
Bolinus, 138
Bolma, 49–50
bonasia, Engina, 169
boninensis, Cellana, 31
borbonica, Septaria, 56
borealis, Cyclocardia, 325
Boreotrophon, 151–152
borneensis, Babylonia, 174
borneensis, Colliella, 33
bornii, Gari, 346
bornii, Gibbula, 41
boschi, Conus, 271
boswellae, Mitra, 198
boswellae, Volutocorbis, 212
botanica, Bulla, 279
boucardi, Arca, 292
bountyi, Fusinus galathea, 188
bovei, Mitra, 197
Brachidontes, 298
brachygyra, Terebra, 273
Bractechlamys, 313
branchi, Siratus, 133
brandaris, Bolinus, 138
branhamae, Fasciolaria lilium, 183
brasiliensis, Adelomelon, 218
brasiliensis, Anadara, 293
brasiliensis, Anomalocardia, 367
brasiliensis, Hinea, 62
brasiliensis, Tellina, 341
brasiliensis, Tellina, 341
brasiliensis, Conus, 269
brasiliensis, Mitra, 200
brassica, Phyllonotus, 135
brayi, Columbarium, 158
brazieri, Conus, 248
brazieri, Haliotis, 20
Brechites, 375
bregeriana, Cypraea, 89
brettinghami, Oliva, 193
brettinghami, Rhinoclavis, 66
brevialis, Mesalia, 59
breviculus, Scutus, 24
brevidentata, Acanthina, 149
brevifrons, Chicoreus, 135
brevis, Clypeomorus, 67
brevis, Colus, 163
brevis, Solen, 339
brevisiphonata, Callista, 358
brevispina, Murex, 130
brevispina, Theodoxus, 55
briareus, Octopus, 377
bridgesii, Columbella, 160
broderipi, Cypraea, 95
broderipiana, Stigmaulax, 109
bronni, Nassarius, 180
brunneus, Turbo, 46
brunneocincta, Truncaria, 170
brunneolinea, Natica, 106
brunneostoma, Nassarius, 179
brunnescent, Cypraea, 97
brunneus, Chicoreus, 137
brunneus, Conus, 272
brunneus, Polinices, 104
bubo, Bursa, 127
bubonius, Strombus, 80
BUCCINIDAE, 162–175
buccinoidea, Bullia, 177
Buccinum, 170
Buccinum, 174–175
buddiana, Chama, 323
bufo, Bursa, 127
bufo, Thais, 146
bufonia, Bursa, 128
bulbacea, Neptunea, 165
bulbiformis, Coralliophila erosa, 155
bulbosa, Oliva, 191
bulbosa, Rapana, 149
Bulbus, 105
bulbus, Conus, 265
Bulla, 279
bulla, Phalium glabratum, 113
bulla, Strombus, 80
bullata, Callipara, 216
bullatiana, Callipara, 216
bullatum, Cardium, 331
bullatum, Trigonostoma, 230
bullatus, Conus, 255
bullatus, Tectarius, 58
Bullia, 177–178
Bullina, 279
bullioides, Amalda, 195
bullisi, Calliostoma, 38
bullisi, Fasciolaria lilium, 183
bullisi, Siphonochelus, 157
buloui, Oliva, 192
bulowi, Oliva, 192
burchardi, Marginella, 235
burchardi, Trachycardium, 329
burgessi, Distorsio, 126
buriensis, Natica, 106
burnetti, Ceratostoma, 142
Burnupena, 170
burryae, Conus floridana, 268
Bursa, 127–129
BURSIDAE, 127–129
buryi, Mitra, 199
buschii, Astraea, 50
Busyon, 176–177
butleri, Scaphella junonia, 223
buxea, Pleuroploca, 183
byronensis, Tivela, 355
byssinus, Conus, 265
Cabestana, 125
cabritii, Conus, 258
cabritii, Murex, 131
cadenasi, Clavus, 240
Cadulus, 283
Caecella, 338
CAECIDAE, 58
Caecum, 58
caelata, Astraea, 50
caelata, Bursa, 128
caerulea, Dosinia, 361
caerulea, Oliva, 191
caerulea, Patella, 29
caerulescens, Marginella, 235
cafrum, Vexillum, 205
cailleti, Siratus, 132
cailleti, Turbo, 47
calcar, Acanthina, 149
calcaratus, Trochus, 44
calcareia, Macoma, 344
Calciatrapessa, 151
calculifera, Xenophora, 74
caldania, Oliva, 193
caledonica, Cypraea, 97
caledonica, Duplicaria, 276
caledonica, Peristernia, 187
caledonicus, Conus cedonulli, 270
californianus, Mytilus, 298
californianus, Tagelus, 349
californica, Bursa, 128
californica, Carditamera, 324
californica, Codakia, 321
californica, Cryptomya, 369
californica, Cumingia, 350
californica, Gari, 348
californica, Macrarene, 48
californicum, Caecum, 58
californicus, Capulus, 72
californicus, Donax, 345
californicus, Mytilus, 298
californiense, Clinocardium, 332
californiensis, Adula, 298
californiensis, Chione, 366
Calinaticina, 104
Callanaitis, 367
callifera, Monilea, 43
Calliostoma, 35–40
Calliotectum, 224
Calliotropis, 36
calliozonus, Chiton, 288
Callipara, 216
callipyga, Circe, 354
Callista, 357–358
Callistochiton, 286
callizona, Siphonalia, 166
Callochiton, 286
callomarginata, Lucapinella, 26
callosa, Amiantis, 357
callosa, Bullia, 177
callosus, Monilea, 43
calodonta, Subcancilla, 203
calophylla, Bassina, 367
Calpurnus, 99
calva, Alcihoe swainsoni, 220
calyculata, Diodora, 26
calyculata, Smaragdina, 280
Calypotena, 351
Calyptraea, 72–73
camelopardalis, Cypraea, 97
camelorum, Cypraea, 87
Campanile, 68
campbelli, Olssonella, 228
campbelli, Strombus vittatus, 79
campechiensis, Neverita, 102
campechiensis, Anadara, 292
campechiensis, Mercenaria, 368
campechiensis, Pholas, 371
Camptoneustes, 311
canaliculata, Amoria, 222
canaliculata, Calliostoma, 36
canaliculata, Haliotis, 21
canaliculata, Raeta, 337
canaliculata, Thais haemastoma, 147
canaliculata, Tonna, 118
canaliculatum, Busycon, 177
canaliculatum, Phalium, 112
canaliculatus, Eichelus, 34
canaliculatus, Nassarius, 180
canaliculatus, Turbo, 47
canaliculus, Perna, 297
canarium, Strombus, 77
canaryensis, Marginella, 233
Cancellaria, 225–228, 231
cancellaria, Barbatia, 293
CANCELLARIIDAE, 225–231
cancellarioides, Vexillum, 207
cancellata, Cancellaria, 226
cancellata, Chione, 365
cancellata, Fulgoraria, 221
cancellata, Lucapina, 26
cancellata, Terebra, 274
cancellata, Trichotropis, 71
cancellata, Vanikoro, 71
cancellata, Varicospira, 82
cancellata, Vexillum, 206
cancellatum, Morum, 116
cancellatus, Conus, 252, 270
cancellatus, Fusitriton, 126
cancellatus, Platyodon, 369
cancellatus, Stigmaulax, 109
cancellinus, Distorsio, 126
Cancilla, 202–203
candeanus, Collisella, 33
candeanus, Malvimalleus, 303
candelabrum, Boreotrophon, 152
candens, Nassarius, 180
candida, Amalda, 195
candida, Barbatia, 293
candida, Barnea, 371
candida, Cypraea, 91
candidus, Modulus, 63
candisata, Bursa, 127
caneloensis, Natica, 109
canetae, Bartschia, 172
canicularis, Clavus, 242
canonicus, Conus, 245
canrena, Natica, 107
Cantharidus, 35
Cantharus, 171–172
caparti, Fusinus, 188
capax, Charonia lampas, 119
capensis, Calyptraea, 73
capensis, Cypraea, 95
capensis, Poropteron, 139
capensis, Pteria, 301
capensis, Thais, 148
capitanellus, Conus, 250
capitaneus, Conus, 250
capitellum, Vasmus, 210
capsoides, Tellina, 342
capucinus, Chicoreus, 136
CAPULIDAE, 71–72
Capulus, 72
caputanguis, Cypraea, 86
caputcolubri, Cypraea, 86
caputdraconis, Cypraea, 86
caputserpentis, Cypraea, 86
characteristicus, Conus, 258
carbonacea, Imbricaria, 204
carbonaria, Mitra, 198
carbonieri, Murex, 130
carcellesi, Calliostoma, 38
carchedonius, Modulus, 63
CARDIIDAE, 326–333
cardinalis, Conus, 268, 269
cardinalis, Mitra, 197
cardissa, Corculum, 330
Cardita, 324–325
Carditamera, 324–325
CARDITIDAE, 324–325
carditoides, Rupellaria, 368
Cardium, 326
carduelis, Enixotrophon, 151
carduus, Acanthotrophon, 153
carduus, Turbo, 46
caribaea, Coralliophila, 156
caribaea, Lima lima, 319
caribaea, Lithophaga, 299
caribaeum, Tugurium, 73
caribbaea, Oocorys, 116
caribbaeum, Cymatium moritinctum, 123
carica, Busycon, 176
Carinaria, 101
CARINARIIDAE, 101
carinata, Cancilla, 203
carinata, Fastigiella, 68
carinata, Haliotis, 21
carinatus, Conus, 254
carinatus, Donax, 345
carinatus, Trophonopsis, 151
carinifera, Cuma, 145
carinifera, Turritella, 60
cariniferoides, Latixis purpuratus, 154
cariniferus, Latirus, 185
Carinodrillia, 243
caricaria, Siratus, 134
carnaria, Strigilla, 343
carnea, Marginella, 234, 235
carnea, Pinna, 300
carnea, Pseudosimnia, 99
carnea, Terebra, 273
carneola, Cypraea, 98
carneola, Oliva, 192
carnicolor, Cancilla, 202
carnosum, Phalium, 112
carolae, Ficus, 117
caroli, Amoria, 222
caroli, Mesopeplum, 306
carolinae, Polia, 172
carolinensis, Sigatica, 105
caroliniana, Polymesoda, 352
carpenteriana, Megasturcula, 241
casinus, Circumphalus, 352
Casmaria, 114
cassidulum, Clypeolum, 56
CASSIDAE, 110–116
cassidiariaeformis, Siphonalia, 166
cassidiiformis, Cancellaria, 227
cassidiiformis, Vasmus, 209
Cassidula, 281–282
cassidula, Lyria, 214
cassiforme, Vasmus, 209
Cassis, 110
casta, Scabricola, 202
castanea, Astarte, 326
castanea, Colubraria, 173
castanea, Cypraea, 88
castanea, Turbo, 47
castaneus, Volutopsius, 162
castrensis, Acila, 289
castrensis, Lioconcha, 359
catalinensis, Austrotrophon cerrosensis, 151
catei, Cypraea, 94
catena, Polinices, 105
catenulatus, Modulus, 63
cathartae, Cymbiola aulica, 216
catholicorum, Cypraea, 93
catilliformis, Spisula, 336
catus, Conus, 258
caudata, Eupleura, 144
caudatum, Cymatium, 122
caurica, Cypraea, 90
caurinus, Patinopecten, 306
Cavolinia, 280
cayensis, Diodora, 25
cayennensis, Natica, 108
cecliae, Conus, 250
cedonulli, Conus, 270
Cellana, 31
cellanoides, Notoacmea, 32
cellulosa, Favaria, 144
centiquadratum, Phalium granulatum, 113
centrifuga, Pteropurpura, 142
centrota, Cancellaria, 231
centurio, Conus, 268

- cepa, Tonna, 118
 ceramica, Terebralia palustris, 64
 ceramicum, Vasm, 208
 ceramidus, Fusinus, 189
 Cerastoderma, 332
 cerata, Leucozonia, 186
 Ceratostoma, 142
 CERITHIIDAE, 64-68
 cerithina, Terebra, 274
 Cerithium, 64-67
 cernica, Cypraea, 85
 cernica, Hastula, 276
 cernicus, Conus, 264
 cernohorskyi, Cancilla, 203
 cerodes, Modulus, 63
 cerrosensis, Austrotraphon, 151
 cervicornis, Chicoreus, 138
 cervina, Cypraea, 96
 cervineta, Cypraea, 96
 cervus, Conus, 255
 cervus, Cypraea, 96
 Chaceia, 372
 Chaetopleura, 286
 chaldeus, Conus, 260
 challengerii, Carinaria, 101
 Chama, 323
 chamaeleon, Nerita, 53
 Chamelea, 352, 367
 CHAMIDAE, 323-324
 chapmani, Patella, 29
 chariessa, Pleurotomella, 241
 chariessa, Tellina, 340
 Charonia, 119
 chartium, Buccinum, 174
 chazalei, Pecten, 305
 Cheilea, 72
 chemnitziana, Clypeomorus, 67
 chemnitzianus, Isognomon, 302
 chenui, Conus, 256
 chiangi, Conus, 263
 Chicoreus, 134-138
 childreni, Cypraea, 84
 childreni, Mitha, 322
 chilena, Calliostoma, 39
 chilensis, Fissurella, 28
 chilensis, Malletia, 291
 chinensis, Caecella, 338
 chinensis, Callista, 358
 chinensis, Calyptraea, 73
 chinensis, Cypraea, 91
 chinensis, Hiattula, 348
 chinensis, Mactra, 334
 chinensis, Natica, 107
 chinensis, Tonna, 118
 Chione, 365-367
 chione, Callista, 358
 chiragra, Lambis, 82
 chishimana, Callista, 358
 Chiton, 287-288
 Chlamys, 308-315
 chlorata, Terebra, 273
 chloris, Mopalia, 286
 chlorizans, Cypraea, 86
 Chlorostoma, 42
 chlorostoma, Thalotia, 41
 chlorostomum, Cymatium, 120
 chlorotica, Clausinella, 367
 chocolata, Thais, 147
 Choromytilus, 297
 chorosina, Voluta, 212
 chorus, Choromytilus, 297
 chrysalis, Mitra, 199
 chrysocestus, Conus, 272
 Chrysostoma, 34
 chrysostoma, Anodontia, 321
 chrysostoma, Cymbiola, 216
 chrysostoma, Mitra, 200
 chrysostoma, Murex, 131
 chrysostomus, Strombus, 80
 chrysostomus, Turbo, 46
 chusaki, Conus, 255
 chytus, Conus, 265
 ciboney, Siratus, 132
 cicercula, Cypraea, 84
 cichoreum, Chicoreus, 134
 cidaris, Turbo, 47
 ciliare, Calliostoma, 37
 ciliata, Mopalia, 286
 ciliatum, Clinocardium, 332
 cincta, Agaronia, 196
 cincta, Burnupena papyracea, 170
 cincta, Marginella, 233
 cinerea, Cypraea, 95
 cinerea, Hastula, 276
 cinerea, Lunella, 48
 cinerea, Ruditapes, 363
 cinerea, Urosalpinx, 144
 cinereus, Conus, 257, 263
 cingulata, Ancillista, 194
 cingulata, Gerdiella, 231
 cingulata, Linatella, 119
 cingulata, Marginella, 232
 cingulata, Trochia, 145
 cingulata, Turritella, 59
 cingulatum, Opeatostoma, 183
 cingulatus, Phymorhynchus, 240
 cingulifera, Xenoturris, 239
 cinisculus, Nassarius, 179
 Circe, 354
 circinata, Aforia, 240
 circinatus, Pitar, 357
 Circomphalus, 352-354
 circularis, Argopecten, 310
 circularis, Turbo, 47
 circumcinctus, Nassarius, 179
 circumcinctus, Conus, 248
 Cirsotrema, 69-70
 cithara, Morum, 116
 citrina, Cypraea, 98
 citrina, Oliva, 190
 citrina, Pinaxia, 150
 citrina, Vexillum, 205
 citrinicolor, Cypraea, 86
 citrinum, Cerithium, 65
 citrinus, Conus regius, 267
 citrinus, Pitar, 356
 Cittarium, 34
 Clanculus, 41, 43
 clandestina, Cypraea, 91
 clandestina, Gelagna, 125
 clanguloides, Clanculus, 43
 clara, Fulgoraria, 221
 clarkei, Fusivoluta, 223
 clarkei, Tasmuthria, 169
 clarki, Conus, 270
 clarki, Glycymeris, 295
 clarki, Periplicaria, 231
 clarus, Conus, 261
 classarius, Conus, 250
 clathrata, Distorsio, 126
 clathrata, Drupa, 151
 clathrata, Nassarius, 178
 clathrata, Periglypta, 353
 clathrata, Vexillum, 206
 clathratus, Boreotrophon, 152
 clathratus, Nassarius, 178
 Clathrodrillia, 241
 clathrum, Epitonium, 70
 clathrus, Neocancilla, 203
 clausa, Natica, 108
 Clausinella, 367
 clava, Eufistulana, 370
 clava, Pseudovertagus, 67
 Clavagella, 375
 CLAVAGELLIDAE, 375
 clavator, Cymatium, 123
 Clavatula, 241-242
 clavatula, Cancellaria, 228
 clavatulum, Peplum, 304
 clavatus, Brechites, 375
 clavatus, Trophonopsis, 151
 Clavocerithium, 68
 Clavus, 240-242
 clavus, Pteryonotus, 141
 CLEIDOTHAERIDAE, 373
 cleidothaerus, 373
 clenchi, Chione, 366
 clenchi, Conus, 268
 clenchi, Neptunea despecta, 165
 cleopatra, Cypraea, 94
 clerii, Conus, 268
 cleryana, Odontocymbiola, 219
 cleryi, Marginella, 232
 cleryi, Typhina, 157
 Clinocardium, 332
 Clinopegma, 164
 Clio, 280
 clisia, Mactrellona, 335
 cloveri, Conus, 265
 clupeiformis, Fissurella, 28
 clypeater, Nacella, 31
 Clypeolum, 56
 Clypeomorus, 65, 67-68
 Clypidina, 25
 clytospira, Conus, 246
 cnissodus, Chicoreus, 136
 coarctata, Cypraeacassis, 111
 coarctatum, Busycon, 177
 coaxans, Geloia, 352
 coceus, Conus, 262
 coccinea, Littorina, 57
 coccineum, Vexillum, 205
 coccineus, Conus, 248
 coccoradiata, Haliotis, 21
 cochlear, Patella, 30
 Cochlespira, 240
 cochlidium, Bullia, 177
 cochlidium, Pugilina, 176
 Codakia, 321
 coelinae, Conus, 253
 coffea, Cypraea, 92
 coffea, Mitra, 197
 coffeae, Conus, 259
 colbecki, Adamussium, 303
 collaria, Natica, 106
 collii, Natica, 107
 Collisella, 32-33
 collisus, Conus, 249
 coloba, Cypraea chinensis, 91
 colombiana, Acesta, 320
 colosseus, Hemifusus, 176
 colpoica, Codakia, 321
 Colubraria, 173
 colubrinus, Conus, 246
 columba, Conus, 269
 columba, Strombus plicatus, 78
 COLUMBARIIDAE, 158
 Columbarium, 158
 columbarium, Peristernia, 187
 Columbella, 160-161
 columbella, Erato, 83
 COLUMBELLIDAE, 159-161
 columbelliformis, Mitra, 199
 columellaris, Purpura, 146
 columellaris, Terebra, 275
 columna, Cerithium, 65
 columnaris, Neverita, 102
 columnella, Cuvierina, 280
 Colus, 162-163
 colus, Fusinus, 187
 colymbus, Pteria, 301
 comatosa, Conus, 252
 Cominella, 169-170
 Comitas, 240, 243
 comma, Cypraea, 93
 commaculata, Terebra, 274
 communis, Ficus, 117
 communis, Neritina, 54
 communis, Turritella, 59
 commutatus, Argopecten, 307
 compacta, Gussonea, 171
 compressa, Emarginula, 24
 compressa, Vexillum, 205
 Compsodrilina, 242-243
 Compsomyx, 362
 compta, Cypraea, 94
 comptonii, Cypraea, 90
 Comptopallium, 307
 comptus, Aeneator, 168
 concamerata, Diloma, 42
 concavum, Sinum, 103
 concentrica, Dosinia, 360
 concentricus, Argopecten irradians, 310
 concentricus, Latirus, 186
 conceptionensis, Scurria, 32
 Concholepas, 146
 concholepas, Concholepas, 146
 conchyliophora, Xenophora, 73
 concinna, Nacella, 32
 concinnus, Murex, 130
 concinnus, Nassarius, 181
 concinnus, Pitar, 356
 concisus, Clypeomorus, 67
 concolor, Patella, 30
 condita, Bursa, 127
 congener, Gemmula, 238
 congregata, Chama, 323
 conica, Calyptraea, 72
 conicopora, Haliotis, 22
 conicus, Polinices, 102
 CONIDAE, 244-272
 coniformis, Parametaria, 160
 coniformis, Voluta, 219
 connectens, Conus, 254
 conoidalis, Nassarius, 178
 conradi, Thracia, 374
 conradi, Turbonilla, 278
 consanguineum, Vexillum, 208
 consimilis, Solecurtus, 348
 consors, Conus, 254
 consors, Trachycardium, 327
 conspersa, Littorina, 57
 conspersus, Conus, 256
 conspicua, Stenoplax, 285
 constricta, Austrocochlea, 41
 constricta, Distorsio constricta, 126
 constricta, Macoma, 344
 constricta, Sinovacula, 349
 consuela, Siratus, 133
 contaminata, Cypraea, 85
 contortuplicata, Olivancillaria, 193
 contracta, Mitra, 200
 contractus, Ischnochiton, 284
 contraria, Neptunea, 166
 contrarium, Busycon, 176
 contrastaria, Cypraea, 96
 controversa, Cypraea, 95
 contusa, Amalda, 194
 conuloide, Calliostoma, 36
 conulus, Imbricaria, 204
 Conus, 244-272
 conus, Pterygia, 204
 conus, Trochus, 45
 convexusculus, Bathymbembis, 35
 convexum, Mesopeplum, 306
 convoluta, Phyllocoma, 149
 cookeana, Macrarenne, 48
 cookei, Chlamys, 314
 Cookia, 48
 cooperi, Cancellaria, 228
 cooperi, Yoldia, 290
 cor, Isocardia, 351
 cor, Paphia, 363
 corallinus, Conus, 258
 corallina, Mactra, 334
 corallinoides, Lyropecten, 315
 corallinus, Manupecten, 311
 Coralliophila, 155-156
 CORALLIOPHILIDAE, 153-157
 Corbicula, 352
 corbicula, Cancellaria, 230
 corbicula, Vexillum, 206
 CORBICULIDAE, 352
 Corbula, 369
 corbula, Conus, 245
 CORBULIDAE, 369
 corbuloides, Thracia, 374
 Corculum, 330
 cordatus, Pitar, 356
 corderoi, Provocator, 220
 cordiformis, Semele, 350
 cordigera, Conus, 247
 cordis, Lyria, 214
 coreensis, Lunella, 48
 coreensis, Turca, 35
 cornea, Mactra, 334
 cornea, Marginella, 232
 cornea, Neritodryas, 55
 corneum, Buccinulum, 170
 corneus, Solen, 339
 cornicula, Nassarius, 179
 cornigera, Vasm, 209
 cornigerum, Vasm turbinellus, 209
 cornu, Lippistes, 71
 cornucervi, Chicoreus, 138
 cornuta, Arcinella, 324
 cornuta, Cassis, 110
 cornutus, Bolinus, 138
 cornutus, Turbo, 46
 coromandelica, Nassaria, 167
 corona, Cymbiola, 216
 corona, Melongena, 175
 corona, Theodoxus, 55
 coronadensis, Macrarenne, 48
 coronadoi, Phallium, 112
 coronata, Lunella, 48
 coronata, Mitra, 200
 coronata, Pinaxia, 150
 coronata, Thais, 148
 coronatus, Conus, 260
 coronatus, Nassarius, 178, 180
 coronatus, Tectarius, 58
 coronatus, Theodoxus, 55
 coronatus, Typhisopsis, 157
 corpulentus, Nassarius, 179
 corrugata, Bursa, 128
 corrugata, Cancellaria, 231
 corrugata, Circe, 354
 corrugata, Eamesiella, 320
 corrugata, Haliotis, 20
 corrugata, Lithophaga, 299
 corrugata, Semele, 350
 corrugata, Venerupis, 364
 corrugata, Vexillum, 205
 corrugata, Xenophora, 74
 corrugatus, Scutus, 24

- cortezi, Surculina, 225
cosmani, Chicoreus, 137
cosmoi, Gemmula congener, 238
costata, Anachis, 160
costata, Crepidula, 72
costata, Cyrtopleura, 372, 378
costata, Fissurella, 28
costata, Harpa, 211
costata, Lyria, 214
costata, Nerita, 53
costata, Paradione, 357
costata, Siliqua, 339
costatum, Calliostoma, 37
costatum, Cardium, 326
costatum, Columbarium, 158
costatum, Tonna, 118
costatus, Latiaxis, 155
costatus, Strombus, 76
COSTELLARIIDAE, 205–208
costellaris, Vexillum subdivisum, 206
costellata, Ovula, 99
costellifera, Nassarius, 180
cothurnata, Natica, 108
Cottonia, 219
coucomi, Cypraea hungerfordi, 98
couderti, Afer, 210
couderti, Conus, 270
couei, Fusinus, 189
coxi, Cypraea, 92
coxi, Cypraea, 89
cracentia, Cymbiolacca, 217
cracherodii, Haliotis, 19
Craspedochiton, 287
crassa, Chione, 366
crassa, Emarginula, 24
crassa, Fissurella, 28
crassa, Harpa, 211
crassa, Mitra, 199
crassa, Monodonta, 41
crassa, Tellina, 342
CRASSATELLIDAE, 325–326
crassicaudus, Hemifusus, 176
crassicauda, Cardita, 325
crassicauda, Protothaca, 368
Crassispira, 243
crassissulca, Paphia, 364
Crassostrea, 318
crassus, Turbo, 47
craticulatum, Phalium, 113
crawfordiana, Cancellaria, 228
crebricostata, Cyclocardia, 325
crebrilineata, Nassarius, 181
crebrisculpta, Haliotis, 22
crematulus, Nassarius, 180
crenata, Amphibola, 281
crenata, Astarte, 325
crenata, Aulacomya ater, 297
crenata, Harpa, 212
crenifera, Neocancilla, 203
crenicipitata, Zierliana, 208
crenulata, Megathura, 26
crenulata, Pterygia, 204
crenulata, Semele, 350
crenulata, Terebra, 274
crenulatus, Nassarius, 180
Crepidula, 72
CREPIDULIDAE, 72–73
cribellum, Cypraea, 93
cribraria, Cypraea, 93
crispa, Turris crispa, 239
crispa, Xenophora, 74
crispata, Periglypta, 353
crispata, Varicospira, 82
crisagalli, Lophia, 318
crisata, Carinaria, 101
crisata, Tellidora, 344
crisatus, Latiaxis, 154
crocata, Lambis crocata, 81
crocatum, Vexillum, 207
crocatulus, Chicoreus, 137
crocatulus, Conus colubrinus, 246
crocea, Circe, 354
crocea, Pterea, 301
crocea, Tridacna, 333
croceus, Conus, 252
Cronia, 145–146
crosseanum, Vasum, 209
crossei, Cypraea, 93
crossei, Scalptia, 229
Crucibulum, 73
cruentata, Cypraea, 89
cruentata, Sanguinolaria, 347
cruentata, Bursa, 129
cruentata, Natica, 106
cruentatum, Vexillum, 206
cruikshanki, Cypraea, 98
crumena, Bursa, 128
crumena, Cypraeacassis testiculus, 111
crumpi, Bathybembix, 35
Cryptomya, 369
Cryptopecten, 308–309, 315
Cryptoplax, 287
Ctena, 321
Ctenocardia, 329
cuba, Scaphella gouldiana, 224
cubaniana, Bursa, 127
Cucullaea, 294
cucullata, Puncturella, 25
cucullata, Saccostrea, 318
cucumerina, Mitra, 199
cucumis, Cymbium, 215
cukri, Sigaluta, 220
CULTELLIDAE, 338–340
cultellus, Ensiculus, 339
Cuma, 145
cumingi, Divaricella, 322
Cumingia, 350
cumingiana, Cancellaria, 227
cumingiana, Mactra, 336
cumingiana, Marginella, 233
cumingii, Afer, 210
cumingii, Conus, 258
cumingii, Cypraea, 94
cumingii, Enaeta, 214
cumingii, Haustellotryphix, 157
cumingii, Lophocardium, 330
cumingii, Metula, 171
cumingii, Neptunea arthritica, 165
cumingii, Spondylus, 316
cumingii, Tellina, 341
cuneata, Mactra, 333
cuneata, Rangia, 336
cuneata, Ungulina, 322
cuneatus, Donax, 346
cuneiformis, Gastrochaena, 370
cuneolus, Conus, 266
cunninghami, Haliotis, 22
curta, Marginella, 234
curtus, Nassarius, 180
curvirostris, Tibia, 82
Cuspidaria, 374
CUSPIDARIIDAE, 374
cuspidata, Clio, 280
cuspidatum, Gyneum, 125
cutacea, Cabestana, 125
cuvieri, Cardita, 325
cuvieri, Conus, 264
cuvierianus, Penion, 168
Cuvierina, 280
Cyanoplax, 286
cyanostoma, Phos, 167
Cyathodonta, 374
Cyclinella, 362
cyclobates, Haliotis, 22
Cyclocardia, 325
Cyclope, 181
Cyclostremiscus, 58
cylindraceus, Conus, 248
cylindrica, Cypraea, 90
cylindricus, Atys, 279
Cyllene, 178
cylleniformis, Enaeta, 214
CYMATIIDAE, 119–126
Cymatium, 120–124
cymba, Sinum, 103
Cymbiola, 216–218
cymbiola, Cymbiola, 216
Cymbiolacca, 217–218
Cymbiolista, 219
Cymbium, 215
cymbium, Gastrochaena, 370
Cyphoma, 100
Cypraea, 83–98
Cypraeacassis, 111
CYPRAEIDAE, 83–98
Cyrtopleura, 372
Cyrtilus, 183
dactyloides, Venerupis, 364
dactylosus, Conus, 246
dactylus, Marginella, 237
dactylus, Pholas, 371
dactylus, Pterygia, 204
daisyae, Volutaconus, 219
dalei, Liomesus, 164
Dalium, 116
dalli, Acesta, 320
dalli, Cirsotrema, 69
dalli, Conus, 272
dalli, Haliotis, 23
dalli, Latiaxis, 156
dalli, Nodulotrophon, 152
dalli, Propeamusium, 303
dalli, Teramachia, 224
dalliana, Collisella, 33
dalliana, Divaricella, 322
dama, Cypraea, 98
dama, Monodonta, 41
dama, Olivella, 193
damicornis, Chicoreus, 138
demonii, Amoria, 222
dampieria, Amoria, 222
danceri, Phenacovolva, 100
dannevigii, Cottonia, 219
daphne, Conus conspersus, 256
darwini, Chlamys, 312
darwini, Fissurella, 28
daucus, Conus, 268
daulleyi, Conus, 254
davidis, Harpa, 211
daviesi, Fulgoraria, 221
dayriti, Serratovola, 308
deaurata, Nacella, 31
deburghiae, Latiaxis, 154
Decatopecten, 307
decemcostata, Neptunea lyrata, 165
decemcostata, Patella, 30
decipiens, Amalda, 194
decipiens, Cypraea, 94
decipiens, Eucrassatella, 326
decipiens, Pododesmus, 317
decisa, Semele, 350
declivis, Gibbula, 42
declivis, Turritella, 60
decolorata, Quoyia, 62
decolorata, Pseudostomatella, 44
decora, Natica, 108
decora, Vexillum, 206
decoratus, Callistochiton, 286
decorata, Chlamys, 311
decorus, Strombus decorus, 80
decurtata, Mitra, 201
decussata, Amaea, 69
decussata, Barbatia, 293
decussata, Distorsio, 126
decussata, Glycymeris, 296
decussata, Haliotis, 20
decussata, Morula, 148
decussata, Nucula, 289
decussata, Venerupis, 365
decussatum, Phalium, 111
decussatus, Jaton, 141
defflorata, Asaphis, 347
deformis, Pyrololus, 162
defrancei, Vexillum, 207
deichmannae, Lischkeia, 35
delessertiana, Lyria, 213
delessertii, Conus, 268
delicata, Fulgoraria, 221
delicatula, Chlamys, 313
delicatula, Tibia, 82
deliciosa, Lyria, 213
delphinus, Angaria, 51
deltoides, Plebidonax, 346
demarcoi, Voluta, 212
demissa, Geukensia, 298
Demoulia, 181
Dendropoma, 61
dennisoni, Morum, 115
dennisoni, Vexillum, 206
dentale, Dentalium, 283
Dentalium, 282–283
dentata, Divaricella, 322
dentatus, Strombus, 78
denticulata, Cellana, 31
denticulata, Marginella, 233
denticulatus, Donax, 345
Dentimitrella, 161
denudatus, Chicoreus, 136
depauperata, Strombus, 77
depictum, Calliostoma, 38
depressa, Amalda, 195
depressa, Cypraea, 97
depressa, Gari, 346
deroyae, Strombina, 159
deroyana, Pteropurpura, 142
desetangii, Scabricola, 202
deshayesi, Anadara, 292
deshayesi, Cymbiola, 217
deshayesi, Mylitta, 324
deshayesi, Gemmula, 238
desidiosus, Conus, 266
desjardini, Marginella, 231
desmoulioides, Nassarius, 179
despecta, Neptunea, 164, 165
deturpensis, Nerita, 53
deynzeri, Mitra, 198
diachroa, Vexillum, 208
Diacria, 280
diadema, Clavatulula, 242
diadema, Conus, 272
diadema, Mitra, 200
diadochus, Marginella, 234, 236
dialeucum, Cerithium, 65
diamesa, Vexillum, 206
diaphana, Scurria, 32
Dibaphus, 201
dichotoma, Asaphis, 347
dichroa, Carinodrillia, 243
dichroa, Chlamys, 313
didyma, Polinices, 102
dieffenbachii, Chlamys, 311
diegensis, Pecten, 305
diemenensis, Irus, 365
dietziana, Corbula, 370
digitalis, Collisella, 33
digitalis, Mitra, 197
digitata, Drupa, 150
digitata, Homalocantha, 139
digitata, Lambis, 82
digitata, Xenophora, 74
digitatus, Comptopallium, 307
digitatus, Spondylus, 316
digna, Diloma, 41
diguetti, Eucrassatella, 326
dilata, Crepidula, 72
dilatum, Macroschisma, 27
dilatus, Penion, 168
dilatus, Strombus, 78
dilecta, Stomatella, 44
dilectus, Chicoreus, 137
dillwyni, Cypraea, 84
Diloma, 41–42
diluculum, Pleurotomaria, 18
dimidiata, Amalda, 195
dimidiata, Terebra, 273
Diminovula, 99
Dinocardium, 331
Diodora, 25–26
diomedae, Acesta, 320
diomedea, Afora, 240
diomedea, Gemmula, 238
diomediae, Calliotropis, 36
dionaeum, Corculum, 330
dione, Pitar, 357
diphos, Hiatala, 347
Diplodonta, 322
dira, Searlesia, 169
directus, Ensis, 339
discinus, Circumphalus, 352
Discors, 332
discors, Mactra, 334
discrepans, Conus, 258
disculus, Tellina, 342
discus, Dosinia, 360
discus, Haliotis, 21
discus, Periploma, 373
dissecta, Callanaitis, 367
dislocata, Terebra, 276
dislocatus, Argopecten, 310
dispar, Penion, 167
distans, Conus, 263
distans, Proteopecten, 304
distinguenta, Codakia, 321
Distorsio, 126
distorta, Colubraria, 173
divaricata, Acila, 289
divaricata, Gibbula, 42
divaricatum, Gafrarium, 354
divaricatum, Solecurtus, 348
Divaricella, 322
diversicolor, Haliotis, 22
divisus, Tagelus, 349
dohrni, Scaphella gouldiana, 224
dohrniana, Haliotis, 23
Dolabellia, 280
dolabrata, Pyramidella, 277
dolarium, Cabestana, 125
dolarium, Calliostoma, 36
Dolicholatrirus, 183
dolum, Tonna, 118
dombeii, Protothaca, 367
dombeii, Tagelus, 349
DONACIDAE, 345–346
donacina, Tellina, 342
donacium, Mesodesma, 337

- Donax, 345–346
 donmoorei, Cypraea mus, 94
 donmoorei, Murex cabritii, 131
 donovani, Semele, 350
 doris, Harpa, 212
 dormitor, Conus, 252
 dorothyae, Favartia, 144
 dorreensis, Conus, 264
 dorsata, Strombina, 159
 dorsatus, Nassarius, 180
 dorsatus, Tapes, 362
 Doryteuthis, 377
 dosin, Dosinia, 360
 Dosinia, 359–362
 drangai, Conus, 271
 Dreissena, 351
 DREISSENIIDAE, 351, 369
 Drupa, 150–151
 dubia, Neritodryas, 55
 dubia, Scaphella, 223
 ducalis, Spondylus, 317
 dufresnei, Zidona, 218
 dunkeri, Dosinia, 362
 dunkeri, Latiaxis, 154
 dupetitthouarsi, Fusinus, 188
 duplex, Hexaplex, 134
 Duplicaria, 274, 276
 duplicata, Duplicaria, 274
 duplicata, Neverita, 102
 duplicata, Turritella, 60
 duplicatus, Conus, 252
 dupontiae, Mitra, 200
 dupontii, Parametaria, 160
 dura, Venerupis, 364
 dusavali, Conus, 255
 dussumieri, Ficus, 117
 dussumieri, Terebra, 275
 dysoni, Diodora, 25
- Eamesiella, 320
 Eastonia, 336
 ebeninus, Pyrazus, 64
 ebenus, Vexillum, 207
 eboreum, Dentalium, 283
 ebraea, Voluta, 212
 ebraeus, Conus, 260
 ebur, Siphonorbis, 163
 eburnea, Cypraea, 98
 eburneum, Cerithium, 65
 eburneus, Conus, 249
 echinata, Acanthocardia, 327
 echinata, Bursa, 128
 echinata, Hydactinia, 378
 echinata, Saccostrea, 318
 echinata, Thais, 148
 echinatum, Vexillum, 207
 echinatus, Latiaxis, 154
 echinatus, Spondylus, 316
 echinophora, Galeodea, 114
 echinus, Nipponotrophon, 151
 ectocomata, Bathyrca, 294
 edax, Hippodrida, 378
 edentula, Anodontia, 321
 edentula, Cypraea, 88
 edentula, Dibaphus, 201
 edithae, Amalda, 194
 edmondsoni, Perilypta, 353
 edule, Cerastoderma, 332
 edulis, Mytilus, 297
 edulis, Ostrea, 318
 edwardi, Conus, 318
 effossa, Sunetta, 354
 eglantina, Cypraea, 97
 Eglisia, 70
 egmontianum, Trachycardium, 327
 elata, Cancellaria, 228
 elatum, Laevicardium, 331
 elegans, Bursa, 128
 elegans, Cancellaria, 225
 elegans, Cantharus, 171
 elegans, Cochlespira, 240
 elegans, Conus, 264
 elegans, Dosinia, 360
 elegans, Drupa, 150
 elegans, Haliotis, 22
 elegans, Harvella, 335
 elegans, Iru, 365
 elegans, Marginella, 236
 elegans, Pseudostomatella, 44
 elegans, Siratus, 132
 elegans, Strombus, 77
 elegans, Tellina, 340
 elegans, Tonicia, 285
 elegans, Tugalia, 24
- elegantina, Marcia, 363
 elegantissima, Euciroa, 375
 elegantulum, Trigonostoma, 230
 elenensis, Murex, 132
 elephantinum, Dentalium, 282
 elephas, Cadulus, 283
 elevata, Diodora, 26
 eliceans, Busycon, 176
 elizabethae, Diodora, 26
 elizabethae, Tellina, 343
 ellioti, Amoria, 222
 elliscrossi, Siratus, 133
 Ellobium, 282
 eloisae, Acteon, 278
 elongata, Alcithoe, 220
 elongata, Amalda, 196
 elongata, Lambis, 82
 elongata, Psammotaea, 347
 elongata, Tridacna, 333
 elongatum, Trachycardium, 328
 elongatus, Chicoreus, 136
 elongatus, Ischnochiton, 284
 elongatus, Pterynotus, 141
 elongatus, Scutus, 24
 elongatus, Trophon, 153
 emaciat, Conus, 253
 emarginata, Hemitoma, 24
 emarginata, Nucella, 145
 emarginatum, Cyphoma, 100
 Emarginula, 24–25
 emblema, Cypraea, 90
 emersoni, Neocancilla, 203
 emmae, Haliotis, 20
 Enaeta, 214
 encastus, Conus, 259
 endivia, Chicoreus, 134
 Engina, 169
 englerii, Cypraea, 86
 Enigmonia, 317
 Enixotrophon, 151
 enna, Clavus, 242
 enode, Trachycardium, 328
 Ensiculus, 339
 ensifera, Yoldia, 290
 Ensis, 338–339
 ensis, Ensis, 339
 entale, Dentalium, 283
 Entodesma, 373
 eos, Prototyphis, 157
 eosila, Ficus, 117
 epamella, Parametaria, 161
 ephippium, Anomia, 317
 ephippium, Isognomon, 302
 ephippium, Psammotreta, 344
 Ephippodonta, 324
 epidromidea, Engina, 169
 epidromis, Strombus, 79
 epiphanea, Vexillum, 207
 episcopalis, Mitra, 197
 episcopalis, Oliva, 191
 episcopus, Conus, 245
 EPITONIIDAE, 68–70
 Epitonium, 68–70
 equestris, Cheilea, 72
 Equichlamys, 313
 Erato, 83
 ERATOIDAE, 83
 erebus, Volutomitra, 225
 eremitarum, Mitra, 198
 Ericusa, 214–215
 erinacea, Ocenebra, 145
 erinaceus, Acanthocardia, 327
 erinaceus, Casmara, 114
 erminea, Marginella, 233
 ermineus, Conus, 266, 268
 Erodona, 369
 erosa, Coralliophila, 155
 erosa, Cypraea, 86
 errans, Bullina, 279
 erroneus, Cypraea, 89
 erycina, Callista, 357
 erythraea, Dosinia, 360
 erythraeensis, Conus, 260
 erythraeensis, Cypraea, 93
 erythraeonense, Cerithium, 64
 erythraeus, Trochus, 45
 erythrinus, Strombus erythrinus, 77
 erythron, Corbula, 369
 erythrogramma, Subcancilla, 203
 erythrostoma, Oliva, 191
 erythrostomus, Phyllonotus, 135
 esontropia, Cypraea, 93
 espinosa, Murex, 131
 esther, Olivella, 193
- esycha, Pteropurpura, 142
 ethologus, Haliotis, 23
 Eichelus, 34
 Euciroa, 375
 eucoronatus, Conus, 252
 eucosmius, Cellana, 31
 eucosmius, Fusinus, 189
 Eucrassatella, 326
 eucymata, Callista, 358
 Eudolium, 116, 119
 euetrios, Conus, 245
 Eufistulana, 370
 eugeniae, Latiaxis, 153
 euglypta, Paphia, 364
 euglyptum, Calliostoma, 37
 eugrammus, Conus, 251
 Eumarcia, 363
 Eunaticina, 104
 eunota, Cypraea, 93
 Eupleura, 144
 eurypter, Pteropurpura, 142
 Euspira, 103
 euzona, Natica, 108
 evanida, Ischnochiton, 284
 evelina, Scaphella, 223
 evelynae, Terebra, 276
 evelynae, Vexillum, 207
 evoluta, Duplicaria, 274
 exalbida, Humularia, 360
 exanthema, Cypraea, 96
 exarata, Cellana, 31
 exaratum, Cymatium, 121
 exaratum, Phalium bandatum, 111
 exasperata, Codakia, 321
 exasperatum, Nemocardium, 330
 exasperatum, Vexillum, 208
 exasperatus, Aequipecten, 309
 exasperatus, Austroclavus, 242
 excavata, Aesta, 320
 excavata, Haliotis, 22
 excavata, Sunetta, 354
 excavata, Tegula, 42
 excavata, Turritella, 60
 excavatus, Conus, 259
 Excellichlamys, 308
 excelsus, Conus, 264
 excisa, Haliotis, 22
 exigua, Haliotis, 21
 exigua, Janthina, 70
 exiguum, Parvicardium, 332
 eximius, Conus, 264
 eximius, Phasianotrochus, 45
 exogyra, Pseudochama, 324
 exoleta, Dosinia, 360
 exoleta, Mactrellona, 335
 exoleta, Turritella, 59
 exoptanda, Amoria, 222
 expansa, Pteropurpura adunca, 142
 expansa, Puncturella, 25
 exquisita, Acanthochiton, 287
 exquisita, Austroharpa, 212
 exquisitus, Subpterynotus, 141
 exusta, Cypraea, 96
 exustus, Brachidontes, 298
 exutum, Tugurium, 74
 exuvia, Nerita, 53
- faba, Donax, 346
 faba, Marginella, 233
 fabula, Conus, 248
 fabula, Tellina, 342
 facetum, Gyrrineum, 125
 faerveensis, Gari, 346
 falcata, Mytella, 298
 falcata, Spisula, 335
 fallax, Cypraea, 93
 fallax, Oliva, 191
 fanel, Natica, 106
 fantomei, Colubraria, 173
 fareri, Chlamys, 313
 fasciata, Ancilla, 196
 fasciata, Bankivia, 41
 fasciata, Littorina, 57
 fasciata, Natica, 106
 fasciata, Ocenebra, 145
 fasciata, Rhinoclavis, 66
 fasciata, Tegula, 42
 fasciatum, Aplustrum, 279
 fasciatum, Tonna, 118
 fasciatus, Melampus, 281
 fasciatus, Planaxis, 62
 fasciatus, Strombus, 80
 fascicularis, Fissurella, 27
 fasciculata, Appisania, 171
- Fasciolaria, 183
 FASCIOLARIIDAE, 182–189
 fastidiosa, Pterygia, 204
 fastigiata, Turritella, 59
 Fastigiella, 68
 fastigium, Peristernia, 186
 Faunus, 64
 fauroti, Homalocantha, 139
 faurotis, Phalium, 112
 fausta, Tellina, 342
 faval, Terebra, 273
 Favartia, 144
 fayae, Tripterotyphis, 157
 fearleyi, Coralliophila, 155
 Felaniella, 323
 felina, Cypraea, 92
 felina, Terebra, 273
 felipponei, Aequipecten, 308
 felipponei, Cabestana, 125
 femorale, Cymatium, 120
 fenestrata, Marchia, 139
 fenestrata, Pterygia, 204
 fenestratus, Siphonorbis, 163
 fenestratus, Trochus, 45
 fenimorei, Fusiturricula, 240
 fergusonii, Conus, 271
 ferminiana, Amaea, 69
 fernandesi, Bursa, 127
 ferrugata, Mitra, 199
 ferruginea, Mitra, 199
 ferruginea, Patella, 29
 ferruginea, Pseudochama, 324
 ferrugineus, Fusinus perplexus, 187
 fervensis, Gari, 346
 Festilyria, 215
 festiva, Callista chinensis, 358
 festiva, Festilyria, 215
 festiva, Pteropurpura, 142
 festivum, Dentalium, 282
 fibula, Neverita, 102
 FICIDAE, 116–117
 Ficus, 116–117
 ficus, Ficus, 117
 figulinus, Conus, 250
 filamentosa, Pleuroploca, 182
 filaris, Cancilla, 202
 filiareginae, Vexillum regina, 205
 filicinctus, Conus, 263
 filmerae, Nassarius, 180
 filosa, Cancilla, 202
 filosa, Ficus, 117
 filosa, Lucinoma, 320
 filosa, Natica, 108
 filus, Latirus, 184
 filus, Turbo, 47
 Fimbria, 322
 fimbria, Phalium, 112
 fimbriata, Cassis, 110
 fimbriata, Cypraea, 92
 fimbriata, Fimbria, 322
 fimbriata, Lataxiena, 153
 fimbriata, Terebra crenulata, 274
 fimbriatus, Astraea, 51
 fimbriatus, Murexiella, 143
 FIMBRIIDAE, 322
 finlayi, Bursa, 129
 finlayi, Siratus formosus, 132
 firma, Chama, 323
 firrhi, Gracilispira, 193
 fischeri, Gaza, 40
 fischeri, Marginella, 236
 fischeriana, Pleuroploca, 183
 fissurata, Emarginula, 24
 fissurata, Scabricola, 202
 Fissurella, 27–28
 FISSURELLIDAE, 24–28
 Fissurellidea, 27
 flabellum, Chlamys, 310
 flabellum, Pinna, 300
 flagellatus, Clanculus, 41
 flammea, Mitrella, 161
 flammea, Cassis, 110
 flammea, Terebra, 276
 flammea, Turricula, 243
 flammiculata, Marcia, 363
 flammiferum, Phalium, 111
 flammula, Cymbiola, 216
 flammulata, Natica, 108
 flammulata, Oliva, 192
 flammulata, Turritella, 60
 flammulata, Vexillum, 208
 flammulatum, Pisania, 170
 flava, Pyrene, 161
 flavicans, Cymbiola, 216

- flavida, Ancilla, 195
 flavidus, Conus, 259
 flavofusca, Mitra, 198
 flavum, Trachycardium, 328
 flemingianus, Polinices, 105
 fletcheri, Conus, 261
 flexuosa, Patella, 30
 flindersi, Altivassum, 210
 floccata, Marginella, 236
 floccatus, Conus, 255
 florida, Callista, 358
 florida, Mitra, 201
 floridana, Anadara, 292
 floridana, Carditamera, 325
 floridana, Conus, 268
 floridana, Natica, 108
 floridana, Polymesoda, 352
 floridana, Pseudomiltha, 321
 floridana, Stenoplax, 284
 floridana, Thais haemastoma, 147
 floridanum, Cerithium, 66
 floridula, Mitra aurora, 200
 floridus, Conus, 255
 floridus, Strombus, 77
 flosculus, Clanculus, 43
 fluctifraga, Chione, 366
 fluctuata, Anachis, 160
 fluctuata, Globularia, 101
 fluctuatus, Turbo, 48
 fluctuosus, Turbo, 48
 fluminea, Corbicula, 352
 foliacea, Phylloda, 340
 foliacea, Placamen, 367
 foliaceolamellosus, Cirkomphalus, 354
 foliata, Bursa crumena, 128
 foliatus, Chione, 136
 fontainei, Ceratostoma, 142
 Foralepas, 27
 forbesii, Tonicia, 285
 fordi, Cirkomphalus, 353
 formosa, Scabricola, 202
 formosa, Semele, 350
 formosense, Calliostoma, 39
 formosense, Vexillum, 205
 formosissimum, Columbarium, 158
 formosum, Calliostoma, 37
 formosum, Dentalium, 282
 formosus, Cymatium, 123
 formosus, Siratus, 132
 fornicata, Crepidula, 72
 fornicatum, Fragum, 329
 Forreria, 151
 forskali, Peristernia, 187
 fortillirata, Turritella, 59
 fortis, Batissa, 352
 fortisulcata, Phalium, 112
 fossor, Donax, 345
 fosteri, Conus, 269
 fourmieri, Ceratostoma, 142
 foveolata, Scalptia, 229
 fraga, Mitra, 199
 fragaria, Patella, 172
 fragilis, Alacmea, 33
 fragilis, Calliostoma, 36
 fragilis, Carinaria, 101
 fragilis, Gastrana, 343
 fragilis, Limaria, 319
 fragilis, Mactra, 335
 fragilis, Strombus, 78
 fragillissimus, Conus geographus, 247
 Fragum, 329
 fragum, Drupa, 151
 fragum, Fragum, 329
 francolina, Nassa, 150
 frater, Neptunea intersculpta, 165
 fraxinus, Conus, 249
 frenguelli, Fusinus, 189
 friendii, Cypraea friendii, 94
 frigidus, Conus, 259
 frisebayeri, Conus armiger, 270
 frons, Lophia, 318
 fruticosus, Latiaxis, 154
 fruticum, Prionovula, 99
 fuegiensis, Nacella, 32
 fujinensis, Serripes, 333
 fulgens, Haliotis, 19
 fulgetra, Ericusa, 214
 fulgetrum, Conus, 260
 Fulgoraria, 221
 fulgurans, Nerita, 52
 fulgurans, Pyrene, 161
 fulgurator, Oliva, 190
 fulgurita, Mitra, 198
 fulmen, Conus, 257
 fulminata, Fulgoraria, 221
 fulminatus, Pitar, 356
 fulminea, Natica, 106
 fultoni, Acila, 290
 fultoni, Cypraea, 94
 fultoni, Trochus, 44
 fulvescens, Hexaplex, 135
 fulvescens, Mitra, 200
 Fulvia, 331
 fumigata, Eumarcia, 363
 fumigatus, Conus, 258
 fumosus, Cantharus, 171
 funebris, Tegula, 42
 funebris, Chlamys, 312
 funerea, Siphonalia cassidariaeformis, 166
 funiculata, Nerita, 54
 funiculata, Olssonella, 227
 funiculata, Terebra, 275
 funiculus, Morula, 148
 furvus, Conus, 256
 fusca, Barbatia, 293
 fusca, Scabricola, 202
 fuscata, Columbella, 160
 fuscata, Conus imperialis, 244
 fuscata, Nerita, 54
 fuscidentata, Cypraea, 88
 fuscomaculata, Cypraea, 93
 "fuscorubra," Cypraea, 88
 (Ours is beachworm *verheefi* Burgess, 1982)
 fuscus, Polinices, 105
 Fusiaphera, 230
 fusiforme, Cerithium, 65
 fusiformis, Adelomelon, 218
 fusiformis, Ericusa, 215
 fusiformis, Mitra, 199
 fusiformis, Oliva, 190
 fusiformis, Siphonorbis, 163
 fusiformis, Solenosteira, 172
 fusiformis, Strombina, 159
 fusiformis, Strombus, 78
 fusinoidea, Strombina, 159
 Fusinus, 187-189
 Fusitriton, 126
 Fusitritula, 240
 Fusitritus, 243
 Fusitritus, 223
 Fusivoluta, 223
 fusoides, Siphonalia, 166
 fusulus, Urosalpinx, 144
 fusus, Alcithoe, 220
 fusus, Tibia fusus, 82
 fusus, Turbinella pyrum, 211
 gabonensis, Clavatula, 242
 gaederopus, Spondylus, 317
 Gafrarium, 354
 gaimardi, Sassa, 124
 galactites, Venerupis, 365
 Galatea, 346
 galathea, Euciroa, 375
 galathea, Fusinus, 188
 galea, Tonna, 118
 galeatus, Strombus, 76
 Galeoastrea, 51
 Galeodea, 114
 galeodes, Volema, 176
 Galeocorys, 115
 gallina, Chamelea, 352
 gallinago, Siratus, 133
 gallinula, Tawera, 366
 galloprovincialis, Mytilus, 297
 gallus, Paphia, 363
 gallus, Strombus, 76
 gambiae, Natica, 106
 gambiensis, Marginella, 232
 gambiensis, Purpurellus, 140
 gangranosa, Cypraea, 85
 gardneri, Serratovola, 308
 gargadia, Tellina, 343
 Gari, 346-348
 gaskoini, Cypraea, 93
 Gastrana, 343
 Gastrochaena, 370
 GASTROCHAENIDAE, 370
 gaudens, Phos, 167
 gaudiosus, Nassarius, 180
 gaugini, Conus, 255
 Gaza, 40
 gazeoides, Amaea, 69
 Gelagna, 125
 Geloina, 352
 Gemma, 362
 gemma, Gemma, 362
 gemma, Maxwellia, 143
 gemma, Pleurotomaria, 18
 gemmata, Rhinoclavis, 67
 gemmatum, Cymatium, 120
 gemmifera, Mayena, 124
 gemmosa, Cypraea nucleus, 85
 Gemmula, 238-239
 gemmulata, Cancellaria, 227
 gemmulata, Chlamys, 313
 gemmulatum, Calliostoma, 37
 Gena, 44
 generalis, Conus generalis, 250
 generosa, Panopea, 371
 Genkamurex, 157
 Genota, 240
 genuanus, Conus, 267
 genuanus, Natica, 108
 geographus, Conus, 247
 Gerdiella, 231
 gerranti, Conus, 266
 Geukensia, 298
 geversianus, Trophon, 152
 gibba, Divaricella, 322
 gibberosa, Astraea, 50
 gibberulus, Strombus gibberulus, 81
 gibbesi, Eucrasatella, 326
 gibbia, Gafrarium, 354
 gibbosa, Olivancillaria, 193
 gibbosa, Plicatula, 315
 gibbosuloides, Nassarius, 181
 gibbosulus, Nassarius, 179
 gibbosum, Cymatium, 121
 gibbosum, Cyphoma, 100
 gibbosus, Strombus gibberulus, 81
 Gibbula, 41, 43
 gibbulus, Latirus, 184
 gibbus, Argopecten, 310
 gibbus, Tagelus, 349
 gigantea, Bursa, 127
 gigantea, Gastrochaena, 370
 gigantea, Glycymeris, 297
 gigantea, Haliotis, 21
 gigantea, Leucotina, 278
 gigantea, Lottia, 33
 gigantea, Patella, 29
 gigantea, Pleuroploca, 182
 gigantea, Ranella, 124
 gigantea, Saxidomus, 359
 giganteum, Tugurium, 73
 giganteum, Umbonium, 44
 giganteum, Brechites, 375
 giganteus, Hinnites, 315
 gigas, Crassostrea, 318
 gigas, Siphonaria, 281
 gigas, Strombus, 75
 gigas, Tridacna, 333
 gilchristi, Conus, 246
 gilchristi, Neptuneopsis, 224
 gilchristi, Volutocorbis, 213
 gilleyi, Cypraea, 97
 girgillus, Galeoastrea, 51
 glabella, Marginella, 233
 glaber, Proteopecten, 304
 glabra, Haliotis, 22
 glabra, Mitra, 198
 glabra, Pleuroploca, 182
 glabrata, Ancilla, 195
 glabrata, Actactodea striata, 338
 glabrata, Cyllene, 178
 glabrata, Mactra, 335
 glabratum, Phalium glabratum, 112
 glacialis, Cuspidaria, 374
 glacialis, Lima scabra, 319
 gladiator, Cancellaria, 231
 gladiator, Conus, 271
 glandiformis, Oliva, 191
 glans, Austrofusius, 166
 glans, Conus, 248
 glans, Cymbium, 215
 glans, Nassarius, 178
 glauca, Mactra, 334
 glauca, Neverita, 105
 glaucum, Phalium, 111
 glaucus, Conus, 249
 globosa, Janthina, 70
 globosum, Anodontia, 321
 globosus, Nassarius, 181
 globosus, Phyllonotus, 134
 Globularia, 101
 globulosa, Bullia, 178
 globulus, Cypraea, 84
 globulus, Ptychosalpinx, 172
 globulus, Vasum, 209
 glomerata, Crassostrea, 318
 gloriakiensis, Conus, 254
 gloriamaris, Conus, 246
 gloriola, Cancellaria, 203
 gloriosa, Chlamys, 309
 gloriosum, Calliostoma, 36
 gloriosus, Spondylus, 316
 glossema, Terebra, 276
 GLOSSIDAE, 351
 Glossus, 351
 GLYCYMERIDAE, 295-297
 Glycymeris, 295-297
 glycymeris, Glycymeris, 296
 glycymeris, Panopea, 371
 Glyphostoma, 242
 glyptus, Aequipecten, 310
 gnidia, Chione, 366
 Godfreyia, 175
 goliath, Strombus, 76
 Gomphina, 364
 gonistoma, Trigonostoma, 230
 gonistoma, Turritella, 60
 gonostoma, Turritella, 60
 goodalli, Marginella, 232
 goodallii, Cypraea, 93
 goodie, Aforia, 240
 gorgon, Boreotrophon, 151
 gouldi, Alora, 70
 gouldi, Halicardia, 375
 gouldi, Solen, 339
 gouldi, Terebra, 276
 gouldiana, Pandora, 372
 gouldiana, Scaphella, 224
 Gourmya, 68
 gourmyi, Gourmya, 68
 gracilior, Benthovoluta, 225
 gracilior, Strombus, 77
 gracilis, Alcithoe, 220
 gracilis, Cancellaria, 203
 gracilis, Colus, 167
 gracilis, Cypraea, 92
 gracilis, Ficus, 117
 gracilis, Harpa, 211
 gracilis, Olivella, 193
 Gracilispina, 193
 gradata, Bullia, 177
 gradatus, Conus 272
 graeca, Diodora, 25
 graeffei, Gemmula, 238
 graeffei, Paphia, 364
 graeffei, Vexillum, 208
 grammatus, Ancistrolepis, 164
 Granata, 34
 granatina, Neocancilla, 203
 granatina, Patella, 30
 grande, Morum, 116
 grandinatus, Tectarius, 58
 grandis, Anadara, 292
 grandis, Fissurella, 28
 grandis, Mactra, 334
 grandis, Neorapana, 149
 grandis, Pandora, 372
 grandis, Solen, 339
 grandis, Typhisala, 158
 grangeri, Conus, 252
 grangeri, Lyria, 213
 graniferus, Nassarius, 181
 granosa, Anadara, 293
 granosa, Cancellaria, 226
 granosa, Pleuroploca, 182
 granosum, Clypeolum, 56
 granosum, Vexillum, 206
 granosus, Trochus, 45
 granti, Haliotis, 22
 granularis, Bursa, 127
 granularis, Patella, 30
 granulata, Acanthopleura, 287
 granulata, Architectonica, 61
 granulata, Cypraea, 85
 granulata, Lunella, 48
 granulata, Protothaca, 368
 granulatum, Calliostoma, 36
 granulatum, Phalium granulatum, 113
 granulatus, Conus, 269
 granulatus, Strombus, 80
 granulosa, Bullia, 177
 grata, Callista, 358
 grata, Cellana, 31
 grateloupianus, Phos, 167
 gravescens, Clausinella, 367
 grayana, Cypraea, 97
 grayi, Amoria, 222
 grayi, Bullia, 177
 grayi, Sconsia, 114
 greenlandicum, Epitonium, 69

- gregoryi, *Anguipecten*, 312
 griseus, *Irus*, 365
 groenlandicus, *Serripes*, 332
 grossi, *Volutoconus*, 219
 grossularia, *Drupa*, 150
 grossularius, *Polinices*, 104
 gruneri, *Argonauta*, 376
 gruneri, *Haliotis*, 22
 gruneri, *Nassarius*, 181
 gruneri, *Turbo*, 47
 gruneri, *Vexillum*, 206
 gryphina, *Pseudochama*, 323
 gualteriana, *Natica*, 107
 gualterianum, *Calliostoma*, 36
 guamensis, *Theodoxus*, 55
 guamensis, *Umbonium*, 43
 gubba, *Conus cinereus*, 257
 gubbi, *Chicoreus*, 137
 gubernator, *Conus*, 255
 guernei, *Emarginula*, 24
 guesti, *Pterynotus*, 141
 guickardi, *Lunulicardia*, 330
 Guildfordia, 49
 guildfordiae, *Guildfordia*, 49
 guillemini, *Euspira*, 103
 guinaica, *Voluta*, 212
 guinaicum, *Cerithium*, 66
 guineensis, *Amaea*, 68
 guineensis, *Conus*, 266
 gunneri, *Boreotrophon*, 152
 gunni, *Turritella*, 60
 guntheri, *Paramoria*, 221
 Gussonea, 171
 guttata, *Bolma*, 49
 guttata, *Cypraea*, 87
 guttata, *Marginella*, 232, 235
 guttata, *Mitra*, 198
 guttata, *Pyramidella*, 277
 guttata, *Strombus*, 80
 guttata, *Terebra*, 273
 guttulus, *Tapes literatus*, 362
 gutturnium, *Cymatium*, 123
 guyanensis, *Mytella*, 298
 gyratus, *Latiaxis*, 153
 Gyryneum, 124–125
 gyrinum, *Gyryneum*, 124
- habei, *Nipponaphera*, 228
 hacketti, *Polinices*, 101
 hadria, *Pleurotomella*, 241
 haemastoma, *Cancellaria*, 227
 haemastoma, *Columbella*, 160
 haemastoma, *Strombus*, 76
 haemastoma, *Thais*, 147
 haematraga, *Astraea*, 51
 haliarchus, *Calliostoma*, 39
 Haliocardia, 375
 HALIOTIDAE, 19–23
 Haliotis, 19–23
 haliotreptus, *Fusinus*, 189
 hamatus, *Ischadium*, 298
 hamillei, *Fulgoraria*, 221
 Haminoea, 279
 hammondae, *Cypraea*, 92
 hancocki, *Terebra*, 277
 hanleyana, *Mitra*, 198
 hanleyanus, *Trochus*, 45
 hanleyi, *Bedeia*, 145
 hanleyi, *Planaxis*, 62
 harfordi, *Amoria*, 222
 harfordi, *Fusinus*, 187
 hargreavesi, *Haliotis*, 23
 hargreavesi, *Volutoconus*, 219
 Harisazea, 49
 Harpa, 211–212
 harpa, *Harpa*, 211
 harpa, *Lyria*, 214
 harpa, *Pyrolophus*, 162
 harpaeformis, *Marginella*, 233
 HARPIDAE, 211–212
 harpifera, *Vexillum*, 206
 harpiformis, *Microcithara*, 161
 Harpulina, 220, 223
 hartwegii, *Cyanoplax*, 286
 Harvella, 335
 hassler, *Calliostoma*, 38
 hastata, *Chlamys hastata*, 314
 hastata, *Hastula*, 276
 Hastula, 274–276
 Haumea, 314
 haurakiensis, *Lorica*, 287
 Haustellotryphix, 157
 haustellum, *Murex*, 129
 haustorium, *Purpura*, 146
- havanensis, *Pterynotus*, 140
 hawaiiensis, *Andodontia*, 321
 hawaiiensis, *Cypraea*, 86
 hawaiiensis, *Gastrochaena*, 370
 hawaiiensis, *Trachycardium*, 328
 hayashii, *Fulgoraria*, 221
 hayashii, *Fusinus*, 188
 haysae, *Natica*, 108
 haysae, *Thais*, 147
 hebraea, *Lioconcha*, 359
 hectica, *Impages*, 273
 Hecuba, 346
 hedleyi, *Calliostoma*, 37
 Helcion, 30
 helenae, *Cypraea*, 85
 helenae, *Mitra*, 199
 Heliacus, 62
 heliacus, *Aequipecten*, 306
 helicoidea, *Vanikoro*, 71
 helicoides, *Bulbus*, 105
 helicoides, *Lippistes*, 71
 helicoides, *Neverita*, 105
 helli, *Strombus*, 78
 heliotropium, *Astraea*, 49
 helmatina, *Marginella*, 233
 helvacea, *Mactra*, 334
 helvacea, *Natica*, 106
 helvacea, *Tugurium*, 74
 helvola, *Cypraea*, 86
 hematita, *Marginella*, 234
 hemiacardia, *Lunulicardia*, 329
 Hemifusus, 176
 Hemitoma, 24
 hemphilli, *Craspedochiton*, 287
 hemphilli, *Latirus*, 186
 hemphilli, *Spisula*, 335
 hendersoni, *Calliostoma bairdii*, 38
 hendersoni, *Niso*, 278
 hepaticum, *Cymatium*, 123
 hepaticus, *Polinices*, 104
 herendeeni, *Colus*, 162
 hericia, *Chlamys hastata*, 314
 hermanni, *Liotina*, 48
 heroica, *Lucinoma*, 320
 heros, *Lunatia*, 103
 heros, *Murex*, 130
 heros, *Neptunea*, 165
 hesitata, *Cypraea armeniaca*, 88
 hesperina, *Cypraea*, 92
 Heterodonax, 347
 hevassi, *Conus*, 263
 hexagonus, *Muricopsis*, 144
 Hexaplex, 134–135, 138
 heyneimanni, *Pleuroploca*, 183
 hians, *Argonauta*, 376
 hians, *Limaria*, 319
 hians, *Ringicardium*, 326
 hians, *Rocellaria*, 370
 hiantina, *Marcia*, 363
 Hiatella, 370
 HIATELLIDAE, 370–371
 Hiatula, 347–348
 hiatula, *Agaronia*, 196
 hidalgoi, *Cypraea*, 94
 hidalgoi, *Murexiella*, 143
 hieroglyphica, *Lioconcha*, 359
 hieroglyphus, *Conus*, 269
 hilaris, *Cantharus*, 35
 hilaris, *Natica*, 109
 hindi, *Latiaxis*, 155
 hindsiiana, *Marginella*, 233
 Hindsiclava, 241
 hindsii, *Mopalia*, 286
 hindsii, *Subcancilla*, 203
 Hinea, 62
 Hinnites, 315
 hinomotoensis, *Baryspira*, 195
 hippocastanum, *Thais*, 147
 HIPPONICIDAE, 71
 Hippopus, 333
 hippopus, *Hippopus*, 333
 hirasei, *Argopecten*, 310
 hirasei, *Conus*, 251
 hirasei, *Cypraea*, 89
 hirasei, *Dentalium*, 282
 hirasei, *Fulgoraria*, 221
 hirasei, *Japellion*, 164
 hirasei, *Murex*, 131
 hirasei, *Oliva*, 191
 hirasei, *Phos*, 168
 hirasei, *Pleurotomaria*, 18
 hirasei, *Protothaca*, 368
 hirtus, *Nassarius*, 181
 hirundo, *Cypraea*, 92
- hirundo, *Pteria*, 301
 hispidus, *Nassarius*, 181
 histrio, *Cypraea*, 97
 histrio, *Dosinia*, 360
 histrio, *Trochus*, 44
 histronica, *Excelllichlamys*, 308
 Homalocantha, 138–139
 Homalopoma, 48
 honoluluensis, *Cypraea*, 85
 hornelli, *Trachycardium*, 327
 horrida, *Distorsio*, 126
 horrida, *Drupa*, 150
 horridus, *Nassarius*, 180
 horridus, *Xanthochorus*, 153
 howelli, *Cypraea armeniaca*, 88
 howelli, *Ficus*, 117
 howensis, *Haliotis*, 23
 howsei, *Colus*, 163
 hoylei, *Trophon*, 153
 huberti, *Marginella*, 234
 humanus, *Glossus*, 351
 humboldti, *Bathybembix*, 35
 humboldti, *Rhinocoryne*, 63
 humerosa, *Fulgoraria*, 221
 Humilaria, 359
 humilis, *Murexiella*, 143
 humphreysi, *Cypraea*, 91
 humphreysianum, *Buccinum*, 175
 hungerfordi, *Cypraea*, 98
 hunteri, *Cymbiolista*, 219
 hunteria, *Fasciolaria lilium*, 183
 hyaena, *Conus*, 258
 hyalinus, *Lissopecten*, 303
 Hybochelus, 34
 hybrida, *Vexillum*, 205
 hybridus, *Conus aemulus*, 265, 267
 Hydatina, 279
 hydrophanum, *Buccinum*, 174
 hyotiss, *Hyotissa*, 318
 Hyotissa, 318
 hyperborea, *Yoldia*, 290
 hypochlorus, *Conus*, 252
- ichinoseana, *Conus*, 252
 icterina, *Cypraea*, 87
 idiopoma, *Natica*, 108
 idoleum, *Latiaxis*, 153
 ignea, *Pisania*, 170
 ignobilis, *Mitra*, 198
 iheringi, *Calliostoma*, 38
 iheringi, *Phalium labiatum*, 114
 illepidia, *Scaeolea*, 290
 Ilyanassa, 178
 ima, *Imaclava*, 241
 Imaclava, 241
 Imbricaria, 204
 imbricata, *Acanthina monodon*, 149
 imbricata, *Arca*, 291
 imbricata, *Astraea*, 50
 imbricata, *Cellana*, 31
 imbricata, *Crucibulum*, 73
 imbricata, *Granata*, 34
 imbricata, *Pinctada*, 302
 imbricata, *Plicatula*, 315
 imbricata, *Tridacna*, 333
 imbricatus, *Latiaxis*, 153
 impacta, *Modiolarca*, 298
 Impages, 273
 impar, *Callista*, 358
 imperatrix, *Marginella*, 233
 imperforata, *Globularia*, 101
 imperforata, *Natica*, 108
 imperforata, *Polinices*, 105
 imperiale, *Epitonium*, 68
 imperialis, *Angaria*, 51
 imperialis, *Astraea*, 49
 imperialis, *Aulica*, 216
 imperialis, *Conus*, 244
 imperialis, *Cypraea*, 96
 imperialis, *Harpa*, 211
 imperialis, *Lischkeia*, 35
 imperialis, *Mitra*, 197
 imperialis, *Spondylus*, 316
 imperialis, *Vasum*, 209
 impertusa, *Stomatella*, 44
 impressa, *Anomalocardia*, 367
 improbulum, *Haliotis*, 21
 inaequalis, *Diodora*, 26
 inaequalis, *Glycymeris*, 295
 inaequalis, *Argopecten*, 310
 inaequalis, *Pandora*, 372
 incantata, *Chlamys*, 313
 incarnata, *Peristernia*, 186
 incei, *Neverita*, 102
- incerta, *Sepia*, 377
 incisus, *Strombus*, 77
 incompta, *Mitra*, 197
 incongrua, *Anadara*, 293
 inconstans, *Hastula*, 275
 incrassata, *Oliva*, 190
 incurrata, *Cypraea*, 87
 incurvus, *Conus*, 272
 indentata, *Cancellaria*, 227
 indica, *Lophiotoma*, 238
 indica, *Melo*, 215
 indica, *Oocorys*, 116
 indica, *Ruditapes*, 365
 indicum, *Tugurium*, 74
 indomaris, *Lambis scorpius*, 81
 inaequalis, *Periploma*, 373
 inermicosta, *Ocenebra*, 145
 inermis, *Tudicula*, 210
 inexpectans, *Natica*, 107
 inezana, *Purpurellus*, 141
 inflata, *Limaria*, 319
 inflata, *Nassarius*, 179
 inflata, *Oliva*, 191
 inflata, *Tellina*, 342
 inflexum, *Peplum*, 304
 informis, *Conus*, 266
 infrenatus, *Conus*, 266
 infundibulum, *Latirus*, 185
 infuscatus, *Cantharus*, 35
 ingens, *Cypraea*, 96
 ingloria, *Cypraea*, 84
 inornata, *Ancillista*, 194
 inornatum, *Phalium*, 114
 inquinata, *Mitra*, 198
 inscriptus, *Conus*, 251
 insignis, *Cellana*, 351
 insignis, *Tonicella*, 285
 insignis, *Trichotropis*, 71
 insulaechorab, *Tibia*, 82
 insulicola, *Cypraea*, 88
 intaistriata, *Psammotreta*, 344
 intercostalis, *Turbo*, 47
 interlineata, *Terebra crenulata*, 274
 intermedia, *Cypraea*, 97
 intermedia, *Ruditapes*, 365
 intermedia, *Thais*, 147
 intermedium, *Cymatium pileare*, 120
 intermedium, *Pseudocyphoma*, 99
 interpres, *Typhina*, 158
 inter puncta, *Harpulina*, 220
 interrupta, *Codakia*, 321
 interrupta, *Tellina*, 341
 interrupta, *Vexillum*, 205
 interruptolineata, *Marginella*, 237
 interruptus, *Conus*, 272
 intersculpta, *Neptunea*, 165
 intricata, *Agaronia*, 196
 intricata, *Payraudeautia*, 105
 intricata, *Turris crista*, 239
 inusitata, *Streptopinna*, 300
 investigatoris, *Ficus*, 117
 invicta, *Gemmula*, 239
 io, *Cancellaria*, 228
 iodostoma, *Conus*, 262
 iodostoma, *Drupa morum*, 150
 ione, *Conus*, 251
 iostoma, *Chama*, 323
 iostoma, *Stigmaulax*, 109
 Iphigenia, 346
 Iphinoe, 71
 iredalei, *Ischnochiton*, 284
 iredalei, *Phalium labiatum*, 114
 iredalei, *Strombus vomer*, 80
 Iredalina, 220
 irescens, *Cypraea*, 92
 iridium, *Calliostoma*, 38
 irina, *Cypraea*, 87
 iris, *Haliotis*, 20
 iris, *Latirus*, 184
 irradians, *Argopecten irradians*, 310
 irregularis, *Chlamys*, 314
 irregularis, *Dendropoma*, 61
 irrorata, *Cypraea*, 84
 irrorata, *Littorina*, 57
 irrorata, *Marginella*, 233
 Irus, 365
 irvinae, *Cymbiola*, 218
 isabella, *Cancilla*, 203
 isabella, *Cypraea*, 95
 isabella, *Strombus*, 77
 isabellamexicana, *Cypraea isabella*, 95
 isabelleana, *Natica*, 109
 isabellina, *Clausinella*, 367
 isaotakii, *Buccinum*, 175

- Ischadium, 298
 Ischnochiton, 284
 ishibashii, Prionovolva, 99
 islandica, Arctica, 351
 islandica, Chlamys, 311
 islandicus, Bulbus, 105
 islandicus, Colus, 163
 Isocardia, 351
 isocardia, Dosinia, 360
 isocardia, Trachycardium, 327
 isocardia, Ventricolaria rigida, 353
 Isognomon, 302
 ISOGNOMONIDAE, 302
 isognomon, Isognomon, 302
 ispidula, Oliva, 192
 isshikiensis, Coralliophila, 155
 ithia, Neptunea, 165
- jacnaensis, Haliotis, 22
 jacnensis, Haliotis, 22
 jacobaeus, Pecten maximus, 304
 jacquelineae, Bolma, 49
 jaculoides, Alcihoe, 220
 jaculum, Compsodrilus, 243
 jacundum, Biplex, 124
 jamaicensis, Collisella, 32
 jamaicensis, Lucina, 320
 janelli, Septaria, 56
 janetae, Splendrillia, 243
 Janthina, 70
 janthina, Janthina, 70
 JANTHINIDAE, 70
 janthostomoides, Natica, 107
 janus, Conus, 256
 Japelon, 164
 japonica, Astraea, 51
 japonica, Atrina, 300
 japonica, Babylonia, 173
 japonica, Carinaria, 101
 japonica, Dosinia, 361
 japonica, Haliotis, 21
 japonica, Marcia, 363
 japonica, Phalium, 112
 japonica, Portlandia, 290
 japonica, Xenophora, 74
 japonicum, Amusium, 303
 japonicum, Fulvia, 331
 japonicus, Cantharidus, 35
 japonicus, Latiaxis, 154
 japonicus, Pitar, 356
 japonicus, Strombus vittatus, 79
 jaquensis, Fusiturricula, 240
 jaspideus, Conus, 270
 Jaton, 141
 javana, Turricula, 243
 javanicum, Calliostoma, 39
 javanicum, Sinum, 103
 javanus, Brechites, 375
 javana, Cancellaria, 228
 jeaniana, Cypraea friendii, 94
 jodoensis, Protothaca, 368
 jeffreysianus, Colus, 163
 jeffreysii, Clathrodorilla, 241
 Jenneria, 98
 jickelli, Conus, 249
 johnsoni, Clavus, 240, 241
 johnsoni, Teramachia, 224
 johnstoneae, Scaphella, 223
 josephina, Neverita, 102
 jourdani, Turbo, 45
 jousseamei, Conus, 253
 jousseamei, Chlamys, 313
 joycae, Cypraea, 89
 jubar, Tellina, 341
 jucundus, Conus, 268
 juddi, Haumea, 314
 jugosa, Engina, 169
 jujubinum, Calliostoma, 37
 Jujubinus, 41
 jukesii, Diodora, 26
 jukesii, Polinices, 105
 jukesii, Vexillum, 205
 juliae, Conus amphiguris, 268
 juliae, Latiaxis, 155
 julieta, Oliva, 190
 julii, Conus, 247
 junonia, Scaphella, 223
 juvenilis, Dosinia, 361
 juvenis, Dosinia, 361
 luctamysium, 315
- kaderlyi, Comitas, 240
 kamakurana, Comitas, 243
 kamschatkana, Haliotis, 19
- kanaka, Vexillum, 207
 kanda, Latirus, 185
 kaneko, Fulgoraria, 221
 kashiwajimensis, Conus, 253
 Katelsia, 363
 Katharina, 287
 katsuae, Cypraea, 91
 kauaiensis, Cypraea, 86
 kauiensis, Spondylus, 316
 kawamurai, Chicoreus, 138
 kawamurai, Lyria, 214
 keati, Conus, 251
 keatiformis, Conus, 247
 keatsiana, Amoria, 222
 keenae, Littorina, 57
 kegaki, Saccostrea, 318
 kelletii, Kelletia, 166
 Kelletia, 166
 kelletii, Chione, 366
 kelletii, Macron, 172
 kelseyi, Lithophaga, 299
 kennerleyi, Humularia, 360
 kennicottii, Beringion, 162
 keppelianus, Pecten, 304
 kermadecensis, Conus, 254
 kermadecensis, Patella, 29
 kerstitchi, Conus, 270
 kesteveni, Astraea, 51
 ketyana, Cypraea, 95
 kieneri, Busycon, 176
 kieneri, Conus, 262
 kieneri, Cypraea, 92
 kieneri, Gemmula, 238
 kieneri, Scaphella dubia, 223
 kieneri, Thais, 147
 kiensis, Cymatium, 122
 kiensis, Limaria, 319
 kiensis, Murex, 131
 kilburni, Volutocorbis, 213
 kimioi, Conus, 251
 kingae, Cypraea, 86
 kingi, Amoria, 222
 kingi, Paradione, 358
 kingicola, Eucassatella, 326
 kinoshitai, Conus, 263
 kinoshitai, Parancistrolepis, 166
 kintoki, Conus, 253
 kiosquiformis, Thais, 148
 kirai, Conus, 257
 kiranus, Latiaxis, 154
 kleckhamae, Strombus, 76
 klemme, Conus, 258
 kleni, Cymatium, 121
 Knefastia, 240
 knockeri, Protoma, 60
 knoxi, Teremelon, 220
 kobelti, Fusinus, 188
 kobeltiana, Arca, 292
 kochi, Rhinoclavis, 66
 kotschyi, Gibbula, 43
 kowiensis, Turritella, 60
 kraussi, Bullia, 177
 kraussii, Patella, 29
 krebsii, Cymatium, 121
 kreuslerae, Notivolva, 219
 kroyeri, Placifusus, 164
 kuesterianus, Hexaplex, 135
 kugleri, Siratus, 132
 kululkan, Conus, 269
 kurachensis, Sunetta, 355
 kurodai, Lyria, 214
 kurodai, Nassarius, 181
 kurodai, Phalium, 112
 kuroharai, Conus, 252
 kuroharai, Cypraea schilderoorum, 98
 kurrachensis, Bullia, 177
 kurtzi, Tudicula armigera, 210
 kurzi, Conus, 248
 kurzi, Distorsio, 126
 kurzi, Guildfordia, 49
 kurzi, Morum, 115
- labiata, Cucullaea, 294
 labiata, Marginella, 235
 labiatum, Phalium labiatum, 114
 labiatum, Strombus, 77
 labiosa, Columbella, 160
 labiosa, Planaxis, 62
 labiosum, Cymatium, 121
 labiosum, Strombus, 79
 labradorensis, Aporrhais, 75
 labrella, Natica, 106
 labrolineata, Cypraea, 85
 labrosa, Malea, 118
- labuanensis, Agaronia, 196
 laceria, Cuma, 145
 lachesis, Turrisipho, 163
 laciniatus, Siratus, 133
 laciniatus, Stramonitropon, 152
 laciniatus, Strombus, 76
 lactea, Cancellaria, 226
 lactea, Marginella, 235
 lacteobasis, Natica, 109
 lacteus, Polinices, 105
 lacunosa, Psammotreta, 344
 Laevicardium, 331-332
 laevigata, Architectonica, 61
 laevigata, Haliotis, 22
 laevigata, Nitidella, 161
 laevigata, Tellina, 341
 laevigata, Turbinella, 211
 laevigatum, Laevicardium, 331
 laevior, Mopalia, 286
 laevis, Callochiton, 286
 laevis, Camptonectes, 311
 laevis, Helcion, 30
 lagenula, Gastrochaena, 370
 lajonkairii, Turbo, 46
 lamarcki, Bursa, 129
 lamarcki, Carinaria, 101
 lamarcki, Mitra, 197
 lamarcki, Spondylus, 317
 lamarckii, Antigua, 353
 lamarckii, Conus, 266
 lamarckii, Cypraea, 87
 lamarckii, Duplicaria, 274
 lamarckii, Patella, 29
 lamberti, Anguipecten, 312
 Lambis, 81-82
 Lambis, Lambis, 81, 378
 Lamellaria, 83
 LAMELLARIIDAE, 83
 lamellaris, Antigua, 353
 lamellata, Callanaitis, 367
 lamellifera, Iru, 365
 lamellosa, Coralliophila meyerendorffii, 155
 lamellosa, Haliotis tuberculata, 20
 lamellosa, Nucella, 145
 lamellosa, Scaplia, 229
 lamellosum, Epitonium, 68
 lampas, Bursa, 127
 lampas, Chironia, 119
 lancea, Dolicholatirus, 183
 lanceata, Hastula, 274
 lanceola, Dolicholatirus, 183
 lanceolata, Resania, 337
 lanceolata, Strombina, 159
 lanei, Agaronia, 196
 langei, Agaronia, 196
 langfordi, Cancilla, 202
 langfordi, Cypraea, 89
 langfordi, Decatopecten, 307
 laperousii, Serripes, 333
 lapillus, Nucella, 145
 lappa, Murexiella, 143
 lapponica, Harpulinia, 220
 laqueatus, Pecten, 305
 laqueatus, Pteryonotus, 141
 largillierii, Marginella, 234
 largillierii, Ruditapes, 365
 largillierii, Volutopsis, 162
 larochei, Alcihoe, 220
 larva, Bullia, 177
 larvata, Chlamys, 312
 laseroni, Trigonostoma, 229
 lasius, Trophonopsis, 152
 lata, Tellina, 341
 Lataxiena, 153
 latemarginata, Fissurella, 28
 Laternula, 372
 LATERNULIDAE, 372
 latiauratus, Leptopecten, 304
 Latiaxis, 153-156
 laticostata, Cardita, 325
 laticostata, Glycymeris, 295
 laticostata, Patella, 29
 laticostatum, Trachycardium, 327
 laticostatus, Fusinus, 188
 latilabris, Haliotis, 22
 latilirata, Chione, 366
 latipinnatus, Latiaxis, 156
 latiriforme, Siphonostoma, 209
 Latirologena, 183
 Latirus, 184-186
 latissimum, Clypeolum, 56
 latissimus, Strombus, 76
 latus, Japelon, 164
 latus, Strombus, 80
- laurae, Murexiella, 143
 laurenti, Amusium, 304
 lauta, Engina, 169
 lavendula, Natica, 107
 lavinia, Ptychobela, 242
 laysanica, Comitas, 243
 lazarus, Chama, 323
 leanum, Periploma, 373
 leeana, Calcitrapessa, 151
 leehmani, Conus barthelemyi, 255
 legatus, Conus, 245
 legrandi, Fusinus, 187
 legumen, Azorinus, 349
 lemniscata, Chlamys, 312
 lemniscata, Natica, 106
 lemniscatum, Clypeomorus, 65
 lemniscatus, Conus, 263
 lens, Mitra, 200
 lentiginosa, Chlamys, 314
 lentiginosa, Circe, 354
 lentiginosa, Cypraea, 91
 lentiginosa, Paphia gallus, 363
 lentiginosus, Conus, 262
 lentiginosus, Strombus, 80
 leo, Bursa, 128
 leoparda, Annachlamys, 306
 leopardus, Conus, 249
 lepida, Oliva, 191
 Lepidopleurus, 284
 Lepidozona, 284
 LEPTONACEA, 324
 Leptopecten, 304
 lessoni, Siphonaria, 281
 lesueurii, Cymatium, 122
 leucodoma, Galeocorys, 115
 leucodon, Cypraea, 95
 leucophaea, Mytilopsis, 369
 leucophaeus, Picipecten, 308
 leucopleura, Collisella, 32
 leucostoma, Buccinum, 174
 leucostoma, Cypraea, 94
 leucostoma, Neocancilla, 203
 leucostoma, Turritella, 60
 Leucosyrinx, 240
 Leucotina, 278
 leucotropis, Lophiotoma, 238
 Leucozonia, 186
 leviathan, Cypraea carneola, 98
 leviiscula, Fulgoraria, 221
 lewisi, Lunatia, 103
 lewisi, Sassa, 123
 lienardi, Conus, 257
 lienardi, Cypraea cicercula, 84
 lifouana, Pterygia, 204
 lifuensis, Cerithium, 64
 ligar, Turritella, 60
 ligata, Vanikoro, 71
 ligatum, Calliostoma, 37
 ligatus, Phos, 168
 lightbourni, Pteryonotus, 141
 lignaria, Oliva, 191
 lignaria, Scaphander, 279
 lignosa, Mopalia, 286
 lilacina, Callista erycina, 357
 lilacina, Marginella, 234
 liliata, Tellina, 345
 liliium, Fasciolaria, 183
 Lima, 319
 lima, Barbatia, 293
 lima, Lima, 319
 lima, Nucella, 145
 lima, Spondylus, 316
 limacina, Cypraea, 85
 Limaria, 319
 limata, Scabricola, 202
 limatula, Collisella, 33
 limatula, Lucapinella, 26
 limatula, Yoldia, 290
 limbata, Marginella, 232
 limbata, Natica, 109
 LIMIDAE, 318-320
 limonetta, Strombina, 159
 LIMOPSIDAE, 294-295
 Limopsis, 294-295
 limosa, Mitra, 197
 Linatella, 119
 lineata, Anatina, 337
 lineata, Ancilla, 196
 lineata, Bullina, 279
 lineata, Marginella, 232
 lineata, Mitra, 201
 lineata, Monodonta, 41
 lineata, Natica, 106
 lineata, Oocorys, 116

- lineata, Perrona, 237
lineata, Subcancilla, 203
lineata, Tellina, 341
lineata, Tonicella, 285
lineata, Vexilla, 150
lineata, Voluta, 212
lineatum, Cymatium, 122
lineatus, Nassarius, 178
lineatus, Planaxis, 62
lineatus, Strombus, 80
lineatus, Trochus, 45
lineolaris, Aequipecten, 307
lineolata, Ancilla, 195
lineolata, Marginella, 236
lineolatus, Ischnochiton, 284
lineum, Buccinulum, 170
Linga, 320
linguafelis, Spondylus, 316
linguafelis, Tellina, 343
lingualis, Terebra, 277
linguata, Limaria, 319
lingulata, Vulsella, 302
linki, Picipecten, 308
linnaei, Turritella, 59
Lioconcha, 359
Liomesus, 164
Liotina, 48
Lippistes, 71
lischkeana, Latiaxis, 154
lischkei, Chlamys, 308
lischkei, Paphia, 364
Lischkeia, 35
Lissopecten, 303
lissostoma, Bursa, 127
lissus, Malluvium, 72
listeri, Cypraea, 92
listeri, Diodora, 25
listeri, Isognomon, 302
listeri, Strombus, 79
listeri, Tellina, 341
litteratus, Tapes, 362
Litharca, 294
lithodomus, Litharca, 294
lithoglyphus, Conus, 257
Lithophaga, 299
lithophaga, Lithophaga, 299
litoglyphus, Conus, 257
litterata, Mitra, 201
litterata, Oliva, 190
litterata, Tapes, 362
litteratum, Cerithium, 65
litteratus, Conus, 249
littorea, Littorina, 56
Littorina, 56–57
LITTORINIDAE, 56–58
livida, Hastula, 276
lividum, Vexillum, 205
lividus, Conus, 259
Livonia, 215, 224
lobata, Drupa, 150
locutenensis, Conus, 246
loebbeckei, Pterynotus, 140
longicaudata, Rhinoclavis, 67
longicaudus, Murex, 129
longicornis, Trubatsa, 157
longicosta, Patella, 30
longirostrata, Phenacovolva, 100
longispina, Astraea, 50
longispina, Theodoxus, 55
longisquamosa, Pteria, 301
longitrosum, Dentalium, 283
longleyi, Tugurium, 73
longurionis, Conus, 252
Lopha, 318
Lophiotoma, 238–239
Lophocardium, 330
lorenziana, Lioconcha, 359
lorenzianus, Conus spurius, 267
Lorica, 287
Loricella, 287
loroisi, Cymatium, 121
loroisi, Harpulina, 223
loroisi, Terebra, 273
loroisi, Conus, 250
lotorium, Cymatium, 120
lotorium, Pteria penguin, 301
Lottia, 33
loveni, Epitonium, 69
loveni, Pteria, 301
lozeti, Conus, 247
lubens, Vexillum, 206
Lucapina, 26
Lucapinella, 26
lucaya, Pleurotomaria, 19
lucidus, Conus, 271
Lucina, 320
LUCINIDAE, 320–322
Lucinoma, 320
luculenta, Chlamys, 314
luculenta, Natica, 109
luculentum, Vexillum, 208
lugubre, Ceratostoma, 142
lugubris, Acanthina, 149
lugubris, Conus, 257
lugubris, Ischnochiton, 284
lugubris, Pleuroploca, 183
luhuanus, Strombus, 80
lunaris, Natica, 108
lunaris, Pecten, 305
Lunatia, 103
Lunella, 48
Lunulicardia, 329–330
lupanaria, Pitar, 357
lurida, Cypraea, 95
lurida, Ostrea, 318
lusoria, Meretrix, 355
lutea, Cypraea, 91
lutea, Recluzia, 70
lutea, Stomatella, 44
lutea, Tellina, 342
luteofasciatus, Theodoxus, 55
luteostoma, Cymbiola, 216
luteostoma, Tonna, 118
luteus, Conus, 262
luteus, Melampus, 281
lutosa, Babylonia, 174
lutosa, Volutocorbis, 213
lutosum, Cerithium, 66
Lutraria, 336–337
lutraria, Lutraria, 337
luzonica, Marcia, 363
lynceus, Conus, 257
lynx, Cypraea, 97
LYONIIDAE, 373
lyraeformis, Lyria, 213
lyrata, Cancellaria, 231
lyrata, Neptunea, 165, 166
lyratum, Lyrocardium, 330
lyratum, Vexillum, 206
Lyria, 213–214
Lyrocardium, 330–331
Lyropecten, 309, 315
macandreae, Aporrhais serresianus, 75
macandrewi, Amoria, 222
macandrewi, Cypraea, 84
macandrewi, Morum, 115
macarae, Conus, 250
macassarensis, Annachlamys, 306
maccullochi, Cypraea, 85
maddocki, Ehippodonta, 324
macerophylla, Chama, 323
macgillivrayi, Murex, 130
macgintyi, Distorsio constricta, 126
macgintyi, Latirus, 185
macgintyi, Murexiella, 143
macha, Ensis, 339
macilenta, Hindsiclava, 241
macleani, Marginella, 235
Macoma, 344
Macrarene, 48
Macrocallista, 359
macromphalus, Nautilus, 377
Macron, 172
macroptera, Pteria, 301
macroptera, Pteropurpura, 142
Macroschisma, 27
macroschisma, Monia, 317
macrospira, Fusliaphera, 230
mactanensis, Favartia, 144
Mactra, 333–336
Mactrellona, 335
MACTRIDAE, 333–338
mactroides, Erodona, 370
mactroides, Mesodesma, 337
mactroides, Tivela, 355
maculata, Amoria, 222
maculata, Macrocallista, 359
maculata, Mactra, 334
maculata, Natica, 107
maculata, Terebra, 273
maculatum, Sinum, 103
maculatus, Strombus, 77
maculatus, Trochus, 45
maculifera, Cypraea, 97
maculosa, Colubraria, 173
maculosa, Crepidula, 72
maculosa, Cypraea, 95
maculosa, Gari, 347
maculosa, Mactra, 334
maculosa, Mitra, 201
maculosa, Natica, 109
maculosa, Pisanina, 170
maculosa, Pyramidella, 277
maculosa, Strombina, 159
maculosa, Terebra, 273
maculosa, Tonna, 118
maculostriata, Tegula, 42
macumba, Cyphoma, 100
macutanica, Latiaxis, 156
madagascariensis, Cassis, 110
madagascariensis, Tellina, 341
madreporarum, Quoyula, 156
magdalenensis, Stenoplax, 285
magellanica, Nacella, 31
magellanica, Odontocymbiola, 219
magellanicum, Epitonium, 70
magellanicus, Aulacomya, 297
magellanicus, Fusitriton, 126
magellanicus, Placopecten, 306
magellanicus, Trophon, 152
Magilus, 156
magistra, Cypraea, 86
magna, Lutraria, 337
magna, Tellina, 340
magnifica, Calyptogena, 351
magnifica, Cymbiola, 217
magnifica, Nassaria, 167
magnifica, Sunetta, 354
magnificus, Chiton, 288
magnificus, Conus, 245
magnificus, Lyropecten, 309
magnificus, Tonna, 118
magnificus, Turbo, 46
magnum, Trachycardium, 327
magnus, Clinopegma, 164
magus, Conus, 254
mainensis, Aporrhais, 75
major, Ancilla, 196
major, Antiplanes, 239
major, Columbella, 160
major, Harpa, 211
major, Nassarius, 179
major, Tectarius, 58
malabarica, Paphia, 363
maldivense, Juxtamusium, 315
maldivus, Conus generalis, 251
Malea, 117–118
MALLEIDAE, 302–303
Malletia, 291
Malleus, 302
malleus, Malleus, 302
Malluvium, 72
malonei, Timoclea, 362
Malvumalleus, 303
mamilla, Livonia, 224
mamillata, Amalda, 194
mammata, Bursa, 129
mammatus, Polinices, 104
mancinella, Thais, 148
mandarina, Penion, 168
manilensis, Corbicula, 352
manitichora, Oliva annulata, 191
manukauensis, Maoricolpus, 59
Manupecten, 311
maoriana, Aulacomya ater, 297
mapiana, Dosinia, 361
Maoricolpus, 59
mappa, Cypraea, 96
Marchia, 139, 141
marchionatus, Conus nobilis, 247
Marcia, 363
marcia, Cypraea, 92
margarita, Cypraea cicercula, 84
margaritacea, Neotrigonia, 320
margaritacea, Pandora, 372
margaritaceum, Periploma, 373
margaritarius, Clanculus, 43
margaritensis, Phyllonotus, 134
Margarites, 34
margaritifera, Pinctada, 301
margaritifera, Nassarius, 180
margaritula, Bursa, 128
marginalis, Cypraea, 86
marginata, Amalda, 194
marginata, Cypraea, 95
marginata, Marginella, 235
marginata, Tonna, 118
marginatus, Solen, 338
marginatus, Strombus, 79
Marginella, 231–237
MARGINELLIDAE, 231–237
Margovula, 99
mariae, Cypraea, 83
mariae, Prothalotia, 36
mariei, Scabricola, 202
mariae, Conus, 261
marionae, Calliostoma, 39
marionensis, Limopsis, 295
maritima, Polymesoda, 352
marmorata, Cymbiolista, 219
marmorata, Niso, 278
marmoratus, Chiton, 288
marmoratus, Turbo, 46
marmorea, Oliva, 192
marmorea, Tonicella, 285
marmoreum, Trachycardium, 327
marmoreus, Conus, 244
maroccana, Natica, 107
maroccensis, Sinistralia, 189
marochiensis, Natica, 107
marquesana, Peristernia, 187
marquesanus, Chiton, 288
marshalli, Beringion, 162
Martesia, 372
martinetana, Marchia, 139
martini, Cypraea, 90
martini, Marginella, 234
martini, Murexiella, 136
martinianum, Sinum, 103
martinii, Tibia, 82
matronalis, Scabricola, 202
matthewsi, Marginella, 235
matthewsi, Morum, 115
mauiensis, Cypraea, 84
maura, Mitra, 199
Maurea, 40
mauritanica, Bullia, 177
mauritanica, Cypraea, 97
mauritanus, Strombus, 80
maurus, Chicoreus, 136
maurus, Polinices, 104
mawae, Latiaxis, 153
maxima, Architectonica, 61
maxima, Fissurella, 28
maxima, Nerita, 53
maxima, Patella, 29
maxima, Tridacna, 333
maximus, Latirus, 183
maximus, Pecten, 304
maximus, Pleuroploca, 183
maximus, Trochus, 45
Maxwellia, 143
Mayena, 124
mazatlantica, Cellana, 31
mazi, Conus, 269
media, Americardia, 329
mediamericanus, Latirus, 184
mediterranea, Xenophora, 74
mediterraneus, Conus, 265
megacerus, Chicoreus, 135
Megapitaria, 359
Megasurcula, 241
Megatebennus, 27
Megathura, 26
Meiocardia, 351
Melagraphia, 42
Melampus, 281
melanacantha, Angaria delphinus, 51
melanaegis, Gomphina, 364
melanemathos, Homalocantha, 138
melanioides, Abyssochrysis, 56
melanocheilus, Tibia fusus, 82
melanostoma, Cypraea, 97
melanostoma, Tonna, 118
melanostomus, Polinices, 104
melastomus, Polinices, 104
melculus, Haliotis, 23
mellosum, Polinices, 105
Melo, 215–216
melo, Melo, 215, 378
melones, Thais, 147
Melongena, 175
melongena, Melongena, 175
MELONGENIDAE, 175–177
melvilli, Abyssochrysis, 56
melvilli, Cypraea, 92
melwardi, Cypraea, 93
memiae, Conus, 262
mendicaria, Engina, 169
menstrualis, Sunetta, 354
mercadai, Scaplia, 230
mercator, Conus, 266
mercatoria, Columbella, 160
Mercenaria, 368
mercenaria, Mercenaria, 368

- Meretrix, 355
 mergus, *Chicoreus*, 135
 meridionalis, *Pecten*, 305
 merista, *Cypraea*, 89
 meroaeformis, *Paphia*, 364
 meroe, *Sunetta*, 355
 Meropesta, 336
 mertensii, *Lepidozona*, 284
 merula, *Oxysteles*, 43
 mesal, *Mesalia*, 59
 Mesalia, 59
 Mesodesma, 337
 mesoleuca, *Scurria*, 32
 Mesoepulum, 306
 messorius, *Murex*, 132
 metallica, *Nacella*, 31
 metcalfei, *Conus*, 257
 Metula, 170
 mexicana, *Patella*, 29
 meyerendorffi, *Coralliophila*, 155
 meyeri, *Conus biliosus*, 259
 micans, *Olivella*, 194
 michaelis, *Cypraea*, 97
 michaudi, *Aporrhais*, 75
 michaudi, *Quoyia*, 62
 Microcithara, 161
 Micromelo, 279
 microphyllus, *Chicoreus*, 136
 microstoma, *Biplex*, 124
 microstoma, *Phalium*, 112
 microurceus, *Strombus*, 77
 midae, *Haliotis*, 21
 midas, *Pleurotomaria*, 19
 middendorffi, *Buccinum*, 175
 middendorffi, *Volutopsis*, 162
 midwayensis, *Chlamys*, 314
 midwayensis, *Cypraea*, 91
 mikawaensis, *Polinices*, 104
 Milda, 278
 mildredae, *Chlamys*, 314
 miles, *Conus*, 258
 miliaris, *Conus*, 260
 miliaris, *Cypraea*, 86
 miliaris, *Vitularia*, 144
 militare, *Calliostoma*, 38
 millocostatum, *Vexillum*, 207
 millegranosa, *Bolma guttata*, 49
 millepeda, *Lambis*, 81
 millepora, *Mitra*, 197
 millepunctata, *Cancilla*, 202
 millepunctata, *Natica*, 109
 millepunctata, *Xenoturris*, 239
 milleri, *Trigonostoma*, 230
 milneedwardsi, *Conus*, 246
 Miltha, 322
 miltonis, *Melo*, 216
 mimus, *Spondylus*, 316
 mindanaensis, *Murex*, 130
 mindanus, *Conus*, 269
 miniacea, *Oliva*, 191
 miniata, *Patella*, 30
 minima, *Batillaria*, 63
 minima, *Cypraea*, 95
 minimus, *Strombus*, 79
 minnamurra, *Conus*, 262
 Minolia, 34
 minor, *Harpa*, 211
 minor, *Olivella*, 194
 minoridensis, *Cypraea*, 92
 minuta, *Diodora*, 25
 Miomelon, 219
 mirabile, *Vexillum*, 207
 mirabilis, *Acila*, 290
 mirabilis, *Iredalina*, 220
 mirabilis, *Marginella*, 236
 mirabilis, *Nihonia*, 243
 mirabilis, *Perissodonta*, 75
 mirabilis, *Thatcheria*, 243
 mirabilis, *Torellia*, 71
 Mirapecten, 315
 mirifica, *Nucula*, 289
 mirificus, *Mirapecten*, 315
 misella, *Cypraea*, 91
 mitchelli, *Amara*, 69
 mitis, *Cymbiola*, 218
 Mitra, 197–201
 mitra, *Acmaea*, 33
 mitra, *Mitra*, 197
 mitraeformis, *Genota*, 240
 mitraeformis, *Lyria*, 213
 mitratus, *Conus*, 248
 Mitrella, 161
 MITRIDAE, 197–208
 mitriformis, *Genota*, 240
 mitriformis, *Narona*, 230
 miyokoe, *Pterynotus loebbeckei*, 140
 modesta, *Bolma*, 49
 modesta, *Littorina*, 57
 modesta, *Vexillum*, 206
 Modiolarca, 298
 Modiolus, 298–299
 modiolus, *Modiolus*, 299
 MODULIDAE, 62–63
 Modulus, 63
 modulus, *Modulus*, 63
 moelleri, *Vexillum*, 208
 moestus, *Nassarius*, 179
 molleri, *Cypraea*, 90
 mollis, *Hinea*, 62
 moltkiana, *Meiocardia*, 351
 moluccensis, *Conus*, 267
 monachialis, *Mitra*, 197
 monachus, *Conus*, 256
 moneta, *Cypraea*, 87
 Monia, 317
 monile, *Calliostoma*, 37
 monile, *Conus*, 251
 Monilea, 43
 monilifera, *Ancilla*, 196
 monilifera, *Bullia*, 177
 monilifera, *Polinices*, 105
 moniliferus, *Clypeomorus*, 67
 monodon, *Acanthina*, 149
 monodon, *Chicoreus*, 138
 Monodonta, 41
 monotimeris, *Leptopecten*, 304
 monotis, *Chlamys*, 311
 monstrosa, *Petricola*, 368
 montgomeryi, *Terebra*, 275
 montrouzieri, *Amalda*, 194
 montrouzieri, *Umbonium*, 43
 Mopalia, 286
 morbida, *Patella*, 30
 morchii, *Cancilla*, 203
 morchii, *Mitra*, 201
 moreleti, *Conus*, 259
 moretonensis, *Cypraea langfordi*, 89
 morio, *Pugilina*, 175
 moritinctum, *Cymatium*, 122, 123
 morrhuanus, *Pitar*, 356
 morrisoni, *Voluta*, 212
 mortoni, *Laevicardium*, 331
 Morula, 148
 Morum, 115–116
 morum, *Drupa*, 150
 morus, *Clypeomorus*, 67
 mosaica, *Marginella*, 232
 motacilla, *Siratus*, 132
 mucronata, *Vexillum*, 207
 mucronatus, *Conus*, 263
 Mulinia, 335
 multiformis, *Batillaria*, 63
 multigemmata, *Maurea*, 40
 multilamellatus, *Spondylus*, 316
 multilineatus, *Conus*, 255
 multimuricatus, *Spondylus*, 316
 multiperforata, *Haliotis*, 23
 multipes, *Lambis*, 81
 multiplicatus, *Murex*, 129
 multipunctatum, *Discors*, 332
 multiradiata, *Callista*, 358
 multirugosus, *Hinnites*, 315
 multispinosus, *Trachycardium*, 328
 multisquamata, *Chlamys*, 311
 multistriata, *Chlamys*, 315
 multistriata, *Limopsis*, 294
 mumia, *Eufistulana*, 370
 munitum, *Cerithium*, 64
 Murex, 129–132
 Murexiella, 136–137, 143
 Murexul, 143
 muricata, *Clavatulula*, 242
 muricata, *Colubraria*, 173
 muricata, *Neorapana*, 146
 muricata, *Pinna*, 300
 muricatum, *Cymatium*, 123
 muricatum, *Trachycardium*, 327
 muricatum, *Vasum*, 209
 muricatus, *Nassarius*, 180
 muricatus, *Tectarius*, 58
 MURICIDAE, 129–153, 157–158
 muricinum, *Cymatium*, 123
 Muricopsis, 143–144
 muriculata, *Vexillum*, 207
 muriculatus, *Conus*, 259
 muriculatus, *Phos*, 168
 murina, *Diodora*, 25
 mus, *Conus*, 268
 mus, *Cypraea*, 94
 muscae, *Amalda*, 196
 muscaria, *Marginella*, 235
 muscaria, *Terebra*, 273
 muscarum, *Cerithium*, 66
 muscosa, *Mopalia*, 286
 muscosus, *Aequipecten*, 309
 Musculus, 298
 musica, *Marginella*, 234
 musica, *Voluta*, 212
 musicus, *Conus*, 261
 muskatensis, *Glycymeris*, 295
 mustelina, *Cassidula*, 282
 mustelinus, *Conus*, 250
 musumea, *Cypraea*, 91
 mutabilis, *Arca*, 291
 mutabilis, *Conus*, 258
 mutabilis, *Cuma*, 14^c
 mutabilis, *Nassarius*, 179
 mutabilis, *Strombus*, 77
 mutica, *Fulvia*, 331
 mutica, *Olivella*, 193
 Mya, 369
 Myadora, 373
 MYIDAE, 369
 Myllita, 324
 MYOCHAMIDAE, 373
 myristica, *Volema*, 176
 myristicatus, *Nassarius*, 178
 mysticus, *Hybochelus*, 34
 Mytella, 298
 MYTILIDAE, 297–299
 Mytilopsis, 369
 Mytilus, 297–298
 myuros, *Terebra*, 274
 Nacella, 31–32
 nadaensis, *Conus*, 254
 naevosa, *Haliotis*, 21
 nagasakiensis, *Latirus*, 185
 nakayasu, *Conus*, 264
 namocanus, *Conus*, 250
 nana, *Bursa*, 127
 nana, *Cassis*, 110
 nana, *Olivella*, 194
 nana, *Tibia*, 82
 nana, *Volutocorbis*, 213
 nanus, *Conus*, 261
 napus, *Turbinella pyrum*, 211
 Naquetia, 133
 Narona, 230
 Nassa, 150
 Nassaria, 168
 NASSARIIDAE, 171, 177–182
 Nassarius, 178–182
 nassatula, *Peristernia*, 186
 nassoides, *Latirus*, 185
 nassula, *Terebra*, 276
 nasuta, *Macoma*, 344
 natalensis, *Fissurella*, 28
 natalensis, *Patella*, 30
 natalensis, *Turbo*, 47
 natalis, *Conus*, 246
 natator, *Gyrineum*, 125
 Natica, 106–109
 NATICIDAE, 101–109
 naucum, *Atys*, 279
 nautica, *Melo*, 215
 NAUTILIDAE, 377
 Nautilus, 377
 navicularis, *Arca*, 291
 nebrites, *Cypraea*, 86
 nebulosa, *Agaronia*, 196
 nebulosa, *Littorina*, 57
 nebulosa, *Marginella*, 232
 nebulosa, *Natica*, 107
 nebulosa, *Terebra*, 275
 neglecta, *Cypraea*, 92
 neglecta, *Patella*, 29
 neglectus, *Onisthichiton*, 285
 neilensi, *Cymbiolacca pulchra*, 217
 Nemocardium, 330
 Neoberingius, 162
 Neocancilla, 203
 Neorapana, 146, 149
 Neothais, 145
 Neotrigonia, 320
 neozelanica, *Xenophora*, 74
 nephele, *Sconsia*, 115
 nephele, *Calliostoma*, 39
 Neptunea, 164–166
 Neptunopsis, 224
 neptuni, *Cymbium*, 215
 neptunia, *Scaphella*, 223
 neptunoides, *Conus*, 262
 neptunus, *Conus*, 262
 Nerita, 52–55
 NERITIDAE, 52–56
 Neritina, 54–55
 Neritodryas, 55
 neritoidea, *Coralliophila*, 155
 neritoideum, *Sinum*, 104
 NERITOPSIDAE, 52
 Neritopsis, 52
 Neverita, 102, 105
 newcombi, *Scabricola*, 202
 nexilis, *Cancilla*, 202
 nicklesi, *Volutocorbis*, 213
 nicobarica, *Meropesta*, 336
 nicobaricum, *Cymatium*, 120
 nicobaricus, *Conus araneosus*, 244
 nicobaricus, *Fusinus*, 188
 nielsenae, *Conus*, 254
 nifat, *Perrona*, 237
 niger, *Cypraea*, 97
 niger, *Lamellaria*, 83
 nigerrima, *Diloma*, 41
 nigerrima, *Nerita*, 53
 nigra, *Atrina*, 300
 nigra, *Fissurella*, 28
 nigra, *Lithophaga*, 299
 nigra, *Planaxis*, 62
 nigrescens, *Conus marmoreus*, 244
 nigricans, *Petalochonus*, 61
 nigrina, *Vexillum*, 206
 nigrirostratus, *Fusinus*, 188
 nigrispinosus, *Murex*, 130
 nigrisquamata, *Cellana*, 31
 nigruta, *Bursa*, 127
 nigritus, *Hexaplex*, 138
 nigropunctata, *Cypraea*, 87
 nigropunctatus, *Conus*, 256
 Nihonia, 243
 niloticus, *Trochus*, 45
 nimboza, *Cypraea*, 90
 nimboza, *Fissurella*, 27
 nimboza, *Macrocallista*, 359
 nimbosus, *Conus*, 261
 nioba, *Paradione*, 357
 niponense, *Buccinum*, 175
 niponicus, *Fusinus*, 187, 188
 Nipponaphera, 228
 nipponensis, *Chlamys*, 313
 nipponica, *Lima*, 319
 Nipponotrophon, 151
 Niso, 278
 nissus, *Conus*, 262
 nitens, *Bathymophila*, 34
 nitida, *Hastula*, 276
 nitida, *Hiatula*, 348
 nitida, *Macra*, 336
 Nitidella, 161
 nitidula, *Colubraria*, 173
 nivea, *Callista umbonella*, 358
 nivea, *Chlamys*, 311
 nivea, *Nassaria*, 168
 nivea, *Olivella*, 193
 nivea, *Spisula*, 336
 niveosa, *Cymbiola*, 218
 niveosa, *Cypraea*, 98
 niveosus, *Conus*, 265
 noae, *Arca*, 291
 nobilis, *Architectonica*, 61
 nobilis, *Bullina*, 279
 nobilis, *Bursa*, 128
 nobilis, *Calliostoma*, 37
 nobilis, *Charonia*, 119
 nobilis, *Chlamys senatoria*, 309
 nobilis, *Conus nobilis*, 247
 nobilis, *Cuspidaria*, 374
 nobilis, *Cymbiola*, 216
 nobilis, *Pinna*, 299
 nobilis, *Polystira*, 239
 nobilis, *Pseudomalaxis*, 62
 nobilis, *Pseudovertagus*, 67
 nodata, *Marginella*, 236
 nodatus, *Latirus*, 184
 nodiferus, *Decatopecten*, 307
 Nodilittorina, 58
 nodiplicata, *Cottonia*, 219
 nodosa, *Argonauta*, 376
 nodosa, *Fissurella*, 28
 nodosa, *Lyropecten*, 309
 nodosa, *Purpura*, 146
 nodosa, *Vexillum*, 207
 nodulifera, *Cancellaria*, 226
 noduliferus, *Tectus pyramis*, 45
 nodulosa, *Mitra*, 200

- nodulosum, Cerithium, 64
 Nodulotrophon, 152
 nodus, Morula, 148
 Noetia, 293
 normaniae, Amoria, 222
 noronhensis, Malea, 119
 norrisi, Cymbiola rutila, 217
 norrisi, Norrisia, 43
 Norrisia, 43
 Northia, 169
 norvegicus, Volutopsis, 162
 notabilis, Anadara, 292
 notata, Clypidina, 25
 notata, Cypraea, 92
 Notoacmea, 32
 Notochlamys, 306
 Notovoluta, 219
 noumeensis, Cypraea, 87
 noumeensis, Latirus, 185
 nouri, Argonauta, 376
 nova, Barbatia, 293
 novaehollandiae, Cerithium, 65
 novaehollandiae, Fusinus, 187
 novaezelandiae, Gracilispira, 193
 novaezelandiae, Pecten, 305
 novaezelandiae, Pecten, 241
 nubecula, Fissurella, 28
 nubila, Mitra nubila, 197
 nuca, Favartia, 144
 nuca, Pterygia, 204
 Nucella, 145
 nucella, Pterygia, 204
 nucleus, Argopecten, 310
 nucleus, Cassidula, 282
 nucleus, Cypraea, 85
 nucleus, Planaxis, 62
 Nucula, 289
 NUCULACEA, 289–291
 Nuculana, 290–291
 nudus, Spondylus, 316
 nugata, Cypraea, 90
 nussatella, Conus, 264
 nuttalli, Ceratostoma, 142
 nuttalli, Clinocardium, 332
 nuttalli, Saxidomus, 359
 nuttalli, Tresus, 337
 nuttalli, Sanguinolaria, 348
 nuttingi, Poirieria, 143
 nuttingi, Vasm globulus, 209
 nuxcastanea, Polinices, 104
 nymphae, Cypraea onyx, 88
 nymphalis, Hiatala, 348

 oahuensis, Hastula, 274
 obeliscus, Rhinoclavis, 66
 obeliscus, Tectus, 45
 obesa, Cancellaria, 227
 obesa, Littorina, 57
 obesa, Marginella, 234
 obesa, Perrona, 237
 obesa, Psammotreta, 344
 obesa, Pterygia, 204
 obliqua, Glycymeris, 296
 obliqua, Nassarius, 181
 obliquata, Barbatia, 293
 obliquata, Scaphia, 228
 obliquus, Solen, 338
 oblita, Cymbiola nivosa, 218
 oblitteratum, Amusium, 304
 oblonga, Amblychilepas, 27
 oblonga, Cancellaria, 225
 oblonga, Lutraria, 337
 oblonga, Ungulina, 322
 oblongum, Laevicardium, 331
 oblongum, Trapezium, 351
 obscura, Colubraria, 173
 obscura, Cypraea, 90
 obscurus, Conus, 247
 obsoleta, Ilyanassa, 178
 obtusa, Amalda, 194
 obtusa, Austrocochlea, 41
 obtusa, Marginella, 236
 obtusata, Demoulia, 181
 obvelata, Cypraea, 87
 occa, Murex, 130
 occidentale, Epitonium, 68
 occidentalis, Aporrhaia, 75
 occidentalis, Arca, 291
 occidentalis, Bulla, 279
 ocellata, Cypraea, 86
 ocellata, Leucozonia, 186
 ocellata, Pyrene, 161
 ocellata, Scabricola, 202
 ocellifera, Pleuroploca, 182

 Ocenebra, 145
 ochroleucus, Conus, 256
 ochroleucus, Trochus, 44
 octangulatum, Dentalium, 283
 octogonus, Murex, 143
 OCTOPODA, 377
 Octopus, 377
 octoradiata, Hemitoma, 24
 octoradiata, Patella, 29
 oculatum, Terebra, 273
 oculatus, Phyllonotus pomum, 134
 oculus, Patella, 30
 Odontocymbiola, 219
 officinalis, Sepia, 376
 okutanii, Cypraea, 87
 oldi, Strombus, 80
 oldroydii, Calinaticina, 104
 olearium, Ranella, 124
 oligocanthus, Chicoreus, 136
 Oliva, 190–193
 oliva, Oliva, 192
 olivacea, Astraea, 51
 olivacea, Cypraea, 89
 olivacea, Knefastia, 240
 olivacea, Nassarius, 179
 olivaceus, Nassarius, 180
 olivaeformis, Imbricaria, 204
 olivaeformis, Marginella, 233
 Olivancillaria, 193–194
 olivaria, Pterygia, 204
 Olivella, 193–194
 OLIVIDAE, 174, 189–196
 olla, Cymbium, 215
 olla, Neverita, 102
 Olssonella, 227–228
 olssonii, Calliostoma, 38
 omaicus, Conus, 253
 onca, Natica, 107
 oneratus, Nassarius, 181
 oniscus, Morum, 115
 Onisthochiton, 285
 onustus, Xenophora, 73
 onyx, Cypraea, 88
 Oocorys, 115–116
 ootanii, Chlamys, 312
 opaca, Polinices, 104
 opalina, Mesalia, 59
 Opeatostoma, 183
 opercularis, Aequipecten, 306
 operculata, Sanguinolaria, 347
 opima, Marcia, 363
 opiniosus, Onisthochiton, 285
 OPISTHOBRANCHIA, 277–280
 optima, Amalda, 194
 oranica, Cypraea, 87
 orbicularis, Codakia, 321
 orbiculata, Ctena, 321
 orbiculata, Glycymeris, 296
 orbigny, Conus, 252
 orbita, Neothais, 145
 orbita, Trachycardium, 328
 orchidiformis, Pterynotus, 138
 ordinaria, Ancilla, 196
 oregon, Calliostoma, 39
 oregonense, Fusitriton, 126
 oregonia, Poirieria, 143
 oriens, Fissurella, 28
 orientalis, Limaria, 319
 orientalis, Mitra, 199
 orientalis, Pholas, 378
 orion, Conus, 271
 ormesi, Penion, 168
 ornata, Chlamys, 314
 ornata, Lioconcha, 359
 ornata, Mactra, 334
 ornata, Marginella, 237
 ornata, Nerita, 54
 ornata, Oliva, 191
 ornata, Terebra, 276
 orosminus, Strombus, 78
 orri, Muricopsis, 143
 oryza, Ancilla, 195
 osilin, Monodonta, 41
 ossea, Imbricaria, 204
 osseus, Purpurellus, 141
 ostensfeldi, Alcihoe, 220
 ostergaardi, Cypraea, 86
 ostergaardi, Mitra, 200
 ostheimeriae, Hemitoma emarginata, 24
 Ostrea, 318
 OSTREIDAE, 317–318
 otolithae, Conus, 251
 Otopleura, 278
 ottoi, Calliotropis, 36

 oualaniensis, Theodoxus, 55
 ovalis, Anadara, 292
 oviformis, Ovula, 99
 ovina, Haliotis, 22
 ovoidea, Chaceia, 372
 ovoidea, Turbinella, 211
 Ovula, 99
 ovulata, Tapes, 362
 ovulata, Corbula, 370
 OVULIDAE, 99–101
 ovum, Cypraea, 89
 ovum, Liomesus, 164
 ovum, Ovula, 99
 oxyacantha, Homalocantha, 139
 Oxytele, 43
 oxytatus, Muricopsis, 144

 pacamoni, Bursa, 128
 pachyus, Cymbium, 215
 pacifica, Arca, 291
 pacifica, Malletia, 291
 pacificum, Rhinocoryne, 63
 pacificus, Boreotrophon, 152
 pacificus, Heterodonax, 347
 pacificus, Solecurtus, 348
 pacificus, Strombus, 80
 Pacipecten, 305, 308
 pacis, Macrarenia, 48
 paetelianus, Latirus, 185
 pagoda, Columbarium, 158
 pagodaeformis, Latirus, 185
 pagodoides, Columbarium, 158
 pagodus, Cantharus, 171
 pagodus, Conus, 252
 pagodus, Latiaxis, 156
 pagodus, Tectarius, 58
 paivae, Bedeva, 145
 palatam, Tellina, 343
 pallida, Babylonia, 174
 pallida, Cypraea, 88
 pallida, Euspira, 103
 pallida, Janthina, 70
 pallida, Mulinia, 335
 pallida, Solenosteira, 172
 pallidula, Cypraea, 92
 pallidula, Xenophora, 75
 pallidum, Buccinum, 170
 pallium, Cryptopecten, 309
 palmarosae, Chicoreus, 136
 palmeri, Aequipecten, 312
 palmeri, Calliostoma, 36
 palmeri, Recluzia, 70
 palmiferus, Chicoreus, 136
 palustris, Terebralia, 64
 panama, Purpura, 146
 panamaensis, Polinices, 105
 panamensis, Austrotrophon, 153
 panamensis, Cuspidaria, 374
 panamensis, Donax, 345
 panamensis, Fusinus, 189
 panamensis, Turcica, 40
 Pandora, 372
 PANDORIDAE, 372
 panniculata, Oliva, 192
 Panomya, 371
 Panope, 371
 Panopea, 371
 pantherina, Cypraea, 97
 papalis, Mitra, 197
 Paphia, 363–364
 paphia, Chione, 366
 Paphies, 337–338
 papilio, Neocancilla, 203
 papilio, Strombus, 80
 papilionacea, Paphia, 364
 papilionaceus, Conus, 265
 papilla, Eunaticina, 104
 papillaris, Babylonia, 174
 papillata, Sepia, 377
 papilliferus, Conus, 257
 papillosus, Calliostoma, 36
 papillosus, Nassarius, 178
 papillosus, Tectarius, 58
 papulosa, Struthiolaria, 75
 papyracea, Burnupena, 170
 papyracea, Psammotreta, 344
 papyracea, Pseudostomatella, 44
 papyraceum, Amusium, 304
 papyratia, Ficus, 117
 Papyridea, 329
 Paradione, 357–358
 paradisiaca, Volema, 176
 paradoxa, Adelomelon, 218
 paradoxa, Galatea, 346

 paradoxum, Chrysostoma, 34
 parallela, Petricola, 369
 Parametaria, 160–161
 Paramoria, 221
 Parancistrolepis, 166
 Parastarte, 362
 parius, Conus, 256
 parkinsoni, Oliva, 192
 parkinsonianum, Cymatium, 122
 parmophoidea, Tugalia, 24
 parthenopeum, Cymatium, 124
 particeps, Nassarius, 178
 parva, Coralliophila, 156
 parva, Haliotis, 21
 parvatus, Conus musicus, 261
 Parvicardium, 332
 parvulus, Conus, 259
 parvulus, Turbo, 46
 passerina, Serratovola, 304
 pastinaca, Conus, 268
 patae, Conus, 269
 patagonica, Atrina, 300
 patagonica, Chlamys, 308
 patagonica, Diodora, 26
 Patella, 29–30
 PATELLIDAE, 29–32
 Patelloida, 33
 patiens, Clypeomorus, 67
 Patinopecten, 306
 patriarcha, Patella, 30
 patriarchalis, Vexillum, 208
 patricius, Conus, 271
 patula, Melongenina, 175
 patula, Purpura, 146
 patula, Siliqua, 340
 paucicostata, Acanthocardia, 327
 paucicostata, Lima, 319
 paucilirata, Acanthina, 149
 pauciruge, Phalium, 113
 pauluccia, Conus, 245
 paumotensis, Patella, 30
 pauperula, Mitra, 201
 pavementum, Natica, 107
 pavlova, Trubatsa, 157
 pavonina, Strombina, 159
 paxillus, Oliva, 192
 Payraudeauia, 105
 paytenorum, Codakia, 321
 paytensis, Columbella, 160
 pazi, Poirieria, 143
 pazii, Conus, 258
 peasei, Cancilla, 202
 peasei, Cypraea, 93
 peasei, Pteris, 301
 Pecten, 304–305
 pecten, Murex, 129
 Pectinaria, 378
 pectinata, Atrina, 300
 pectinata, Glycymeris, 295
 pectinata, Lucina, 320
 pectinata, Neotrigonia, 320
 pectinata, Siphonaria, 281
 pectinatum, Cardium, 331
 PECTINIDAE, 303–315
 pectiniforme, Trachycardium, 328
 pectoralis, Callista, 358
 pectorina, Protohaca, 368
 pectunculus, Glycymeris, 295
 pedersenii, Enaeta, 214
 pedicula, Trivia, 83
 Pedum, 315
 pedum, Pedum, 315
 pelepili, Favartia, 144
 pelliserpentis, Chiton, 288
 pelliserpentis, Mitra, 201
 pelliserpentis, Tegula, 42
 pellistigrina, Natica, 109
 pellucida, Chama, 323
 pellucida, Cyclope, 181
 pellucida, Maurea, 40
 pellucida, Trigonostoma, 229
 pellucidus, Helcion, 30
 pellucidus, Pterynotus, 140
 peloronta, Nerita, 52
 pelsenieri, Chlamys, 313
 pelta, Collisella, 33
 penchinati, Chicoreus, 137
 penguin, Pteris, 301
 penicillata, Hastula, 274
 Penion, 168
 penis, Brechites, 375
 pennaceae, Glycymeris, 296
 pennaceus, Conus, 245
 pennsylvanica, Linga, 320

- Peplum, 304
 pepo, Cymbium, 215
 perca, Biplax, 124
 perdistorta, Distorsio, 126
 perdis, Phasianella, 52
 perdis, Tonna, 118
 perellegans, Siratus, 132
 pergrandis, Conus, 261
 pergrandis, Marginella, 236
 pericallus, Cypraea, 89
 pericochlion, Japellion, 164
 perideris, Trajana, 167
 Periglypta, 353
 Periploma, 373-374
 PERIPLOMATIDAE, 373-374
 periscelida, Gemmula, 238
 Perissodonta, 75
 Peristernia, 186-187
 peristicta, Cymbiolacca, 217
 peristicta, Cypraea, 90
 perlae, Cypraea decipiens, 94
 Perna, 297
 perna, Isognomon, 302
 perna, Perna, 297
 Phymorhynchus, 240
 phymotis, Stomatia, 44
 physis, Hydatina, 279
 pica, Citarium, 34
 pica, Mitra, 201
 pica, Thais, 147
 picea, Nerita, 55
 picta, Cypraea, 87
 picta, Fissurella, 28
 picta, Haliotis, 22
 picta, Lioconcha, 359
 picta, Lunella, 48
 picta, Purpura, 146
 picta, Sigaretotrema, 103
 picta, Strombus, 76
 picta, Theodoxus, 55
 picta, Vexilla, 150
 pictum, Laevicardium, 331
 pileare, Cymatium, 120
 pileopsis, Notoacmea, 32
 pilkeyi, Conus, 256
 pilosa, Glycymeris, 296
 Pilosabia, 72
 pilsbryi, Lambis crocata, 81
 pilsbryi, Latiaxis, 155
 pilsbryi, Patella, 29
 pilsbryi, Phalium, 112
 pilsbryi, Vexillum, 208
 Pilsbryspira, 243
 Pinaxia, 150
 pinchoti, Codakia, 321
 Pinctada, 301-302
 Pinguicula, 238
 pinguis, Anapella, 338
 pinguis, Demoulia, 181
 pinguis, Marcia, 363
 Pinna, 299-300
 pinnatus, Austrotrochus cerrosensis, 151
 pinnatus, Pterotyphus, 157
 pinnatus, Pterynotus, 140
 PINNIDAE, 299-300
 pinniger, Purpurellus, 141
 pintado, Littorina, 57
 piperata, Marginella, 236
 piperatus, Conus, 259
 piperita, Cypraea, 90
 piperitum, Cerithium, 65
 pipus, Strombus, 80
 Pisanis, 170
 piscatoria, Cancellaria, 227
 pisiformis, Strigilla, 343
 Pitar, 356-357
 Placamen, 367
 placans, Polymesoda, 352
 placenta, Placenta, 317
 Placiphorella, 285
 Placopecten, 306
 Placuna, 317
 Plagiocardium, 332
 plana, Scrobicularia, 350
 planata, Haliotis, 22
 planata, Tellina, 342
 planatella, Paradiene, 357
 PLANAXIDAE, 62
 Planaxis, 62
 planaxis, Littorina, 57
 planicostata, Lyria, 214
 planicostatus, Conus, 252
 planiliratus, Conus, 251
 planiusculum, Periploma, 373
 planorbis, Conus, 256
 planospira, Nerita, 54
 planospira, Purpura, 146
 planulata, Hiatula, 348
 planulata, Stomatella, 44
 planulata, Tivela, 355
 Platyodon, 369
 Plaxiphora, 286
 plebeius, Tagelus, 349
 Plebidonax, 346
 pleii, Doryteuthis, 377
 pleuronectes, Amusium, 303
 Pleuroploca, 182-183
 Pleurotomaria, 18-19
 PLEUROTOMARIIDAE, 18-19
 Pleurotomella, 241
 plexa, Nerita, 54
 plicaria, Phalium, 112
 plicarium, Vexillum, 205
 plicata, Coralliophila, 156
 plicata, Nassarius, 178
 plicata, Nerita, 54
 plicata, Psammotreta, 344
 plicataria, Harvella, 335
 plicatella, Hastula, 276
 plicatella, Raeta, 337
 Plicatula, 315
 PLICATULIDAE, 315
 plicatulus, Geukensia, 298
 plicatum, Vexillum, 205
 plicatus, Plicifusus, 163
 plicatus, Stramonitophon, 152
 plicatus, Strombus, 77
 plicatus, Strombus plicatus, 78
 plicifera, Natica, 109
 pliciferoides, Siratus, 134
 Plicifusus, 163-164
 plicispirus, Polinices, 104
 plicus, Decatopecten, 307
 plorator, Pteropurpura, 142
 plumbus, Polinices, 102
 plumbeus, Conus, 248
 plumula, Lithophaga, 299
 Pododesmus, 317
 poehlianus, Conus, 264
 poirieri, Chicoreus, 136
 Poirieria, 143
 polare, Buccinum, 174
 polaris, Nacella, 32
 poliana, Euspira, 103
 Polinices, 101-105
 polita, Cypraea, 85
 polita, Katelysia, 363
 polita, Nerita, 53
 polita, Nuculana, 290
 politum, Nassarius, 179
 Pollia, 172
 polyglotta, Conus eburneus, 249
 polygonus, Latirus, 184
 polygramma, Clinopogon unicum, 164
 polygramma, Patella concolor, 30
 polygrammus, Conus, 255
 Polymesoda, 352
 polymorpha, Dreissena, 351
 polymorpha, Mitra, 198
 polynyma, Spisula, 335
 POLYPLACOPHORA, 284-288
 Polystira, 239
 polytropia, Lophiotoma, 239
 pompholax, Bathyrca, 294
 pompilius, Nautilus, 377
 pomum, Malea, 118
 pomum, Phalium, 113
 pomum, Phyllonotus, 134
 ponderosa, Casmaria ponderosa, 114
 ponderosa, Dosinia, 362
 ponderosa, Noetia, 293
 ponderosa, Pleuroploca, 182
 ponderosa, Siliquaria, 61
 ponderosa, Tivela, 355
 ponderosum, Morum, 115
 ponderosus, Strombus, 76
 pongo, Conus, 255
 ponsonbyi, Festilyria, 215
 pontificalis, Conus, 264
 pontificalis, Mitra, 197
 poormani, Conus, 272
 poraria, Cypraea, 86
 porcellana, Marginella, 235
 porcellanus, Hippopus, 333
 Poropteron, 139
 porphyria, Oliva, 190
 porphyrites, Lunella, 48
 porphyrostoma, Afer, 210
 porterii, Cypraea, 89
 Portlandia, 290
 POTAMIDIDAE, 63-64
 poulsoni, Ocenebra, 145
 pourtalesii, Haliotis, 19
 powelli, Buccinum pallidum, 170
 powelli, Charonia rubicunda, 119
 powisi, Tibia, 82
 powisiana, Neverita, 102
 praecallosa, Marginella, 232
 praecellens, Conus, 258
 praeclearum, Morum, 115
 praefectus, Conus, 254
 praefectus, Conus, 256
 praelatus, Conus, 245
 praestantissima, Cancellaria, 202
 praetexta, Amoria, 222
 praetextus, Conus, 259
 pratasensis, Sigaluta, 220
 preissii, Prothalotia, 36
 pretiosa, Terebra, 274
 pretiosum, Dentalium, 283
 pretiosum, Epitonium, 68
 priamus, Ampulla, 224
 priapus, Panomya, 371
 pribiloffensis, Neptunea intersculpta, 165
 Priene, 124
 Primovula, 100
 princeps, Conus, 271
 princeps, Cypraea, 96
 princeps, Hexaplex, 135
 princeps, Pleuroploca, 182
 princeps, Spondylus, 316
 pringlei, Afrivoluta, 231
 Prionovola, 99
 Prionovola, 99
 prioris, Conus, 252
 prismaticus, Latirus, 184
 pristin, Northia, 169
 probatum, Nemocardium, 330
 problema, Clypeomorus, 65
 proboscidalis, Cymbium, 215
 procera, Colubraria, 173
 procerum, Cerithium, 66
 procerum, Trachycardium, 327
 proditum, Cerithium, 65
 producta, Anomalocardia, 367
 proficua, Semele, 350
 profundorum, Conus, 261
 prolongata, Janthina, 70
 prometheus, Conus, 265
 propatula, Agaronia, 196
 Propeamussium, 303
 Propofusus, 189
 propinqua, Terebra, 275
 propinquus, Colus, 163
 propinquus, Conus, 264
 prora, Pitar, 356
 Proteopecten, 304
 proteus, Cantharus, 171
 proteus, Conus, 267
 Prothalotia, 35-36
 Protoma, 60
 Prothothaca, 367-368
 Prototyphus, 157
 Provocator, 220
 proxima, Nucula, 289
 proximus, Conus, 261
 prunum, Marginella, 235
 PSAMMOBIIDAE, 346-348
 Psammotaea, 347
 Psammotreta, 344
 Pseudamussium, 311
 Pseudastalium, 49-50
 pseudocarnaria, Strigilla, 343
 pseudochama, 323-324
 Pseudocypoma, 99
 pseudodon, Opeatostoma, 183
 pseudofaba, Marginella, 233
 pseudolima, Plagiocardium, 332
 Pseudomalaxis, 62
 Pseudomiltha, 321
 pseudoscorpion, Lambis, 81
 Pseudosimnia, 99
 Pseudostomatella, 44
 pseudotulip, Modiolus, 299
 Pseudovergatus, 67
 pseustes, Natica, 107
 psyche, Calliostoma bairdii, 37
 Pteria, 301
 PTERIIDAE, 301-302
 Pterochelus, 141

PTEROPODA, 280

Pteropurpura, 140-142
 Pterotyphis, 157
 Pterygia, 204-205
 Pterynotus, 138, 140-141
 Ptychobela, 242
 Ptychosalpinx, 172
 Ptychosyrinx, 238
 pubescens, Hecuba, 346
 pubescens, Thracia, 374
 pudica, Pterygia, 204
 puella, Prothalotia, 36
 puerpera, Periglypta, 353
 Pugilina, 175-176
 pugilis, Strombus, 77
 pulchella, Biplex, 124
 pulchella, Cochlespira, 240
 pulchella, Cypraea, 89
 pulchella, Euspira, 103
 pulchella, Peristernia, 187
 pulchellum, Vexillum, 207
 pulchellus, Conus, 254
 pulchellus, Strombus plicatus, 78
 pulcher, Conus, 265
 pulcher, Siratus, 133
 pulcher, Turbo, 47
 pulcherrima, Haliotis, 22
 pulcherrima, Prothalotia, 36
 pulchra, Cymbiolacca, 217
 pulchra, Cypraea, 95
 pulchra, Engina, 169
 pulchra, Littorina, 57
 pulchra, Patella, 30
 pulchra, Polia, 172
 pulchra, Terebra, 274
 pulchrelineatus, Conus, 254
 pulchricostatus, Trachycardium, 328
 pulchrum, Rhinoclavis, 66
 pulicaria, Cypraea, 90
 pulicarius, Conus, 260
 pullastra, Venerupis corrugata, 364
 pulligera, Neritina, 54
 pullus, Nassarius, 181
 PULMONATA, 281-282
 pumilio, Strombina, 159
 pumilus, Favartia, 144
 punctata, Austroharpa, 212
 punctata, Codakia, 321
 punctata, Cypraea, 90
 punctata, Imbricaria, 204
 punctata, Natica, 106
 punctata, Pandora, 372
 punctata, Pyrene, 161
 punctata, Tapes, 362
 puncticulata, Mitra, 200
 puncticulata, Neritina, 55
 puncticulatus, Conus, 269
 puncticulatus, Pecten, 305
 punctostriatus, Scaphander, 280
 punctulata, Acanthina, 149
 punctulata, Cypraea, 91
 punctulata, Maurea, 40
 punctulata, Monodonta, 41
 Puncturella, 25
 punicea, Ruditapes, 363
 punicea, Tellina, 341
 puniceus, Clanculus, 43
 Pupa, 278
 pupa, Puperita, 55
 Puperita, 55
 pupillus, Margarites, 34
 pura, Bullia, 177
 pura, Cancilla, 202
 pura, Mactra, 334
 Purpura, 146
 purpurascens, Conus, 271
 purpurascens, Semele, 350
 purpurata, Amiantis, 357
 purpuratus, Argopecten, 310
 purpuratus, Latiaxis, 154
 purpuratus, Saxidomus nuttalli, 359
 purpurea, Tellina, 341
 Purpurellus, 140-141
 purpureum, Morum, 115
 purpureus, Amauropsis, 105
 purus, Conus, 258
 pusilla, Nassaria, 167
 pusillum, Gyreneum, 125
 pusio, Chlamys, 315
 pusio, Pisanina, 170
 pustulata, Jenneria, 98
 pustulosum, Argobuccinum, 125
 putealis, Polinices, 101
 pyramidalis, Nassarius, 180

pyramidata, Clio, 280
 Pyramidella, 277-278
 pyramis, Mitra, 198
 pyramis, Polinices, 102
 pyramis, Tectus, 45
 pyramus, Pleurotomaria, 18
 Pyrazus, 64
 Pyrene, 161
 pyriforme, Eudolium, 116
 pyriformis, Conus, 271
 pyriformis, Coralliophila, 155
 pyriformis, Cypraea, 89
 pyriformis, Polinices, 102
 Pyrolofusus, 162
 pyrrhostoma, Fusivoluta, 223
 pyrrhus, Nassarius, 180
 pyrrulatus, Propetus, 189
 pyrum, Busycon, 176
 pyrum, Cymatium, 123
 pyrum, Cypraea, 95
 pyrum, Phalium pyrum, 113
 pyrum, Turbinella, 210, 211
 pyrum, Volema, 176
 Pythia, 282
 pyxidata, Pecten, 304

quadragenarium, Trachycardium, 327
 quadrangularis, Samarangia, 360
 quadricarinatus, Euchelus, 34
 quadrilineata, Marginella, 237
 quadrimaculata, Cypraea, 90
 quadrupunctata, Trivia, 83
 quadrisculata, Divaricella, 322
 queenslandica, Cypraea, 89
 queketti, Haliotis, 21
 queketti, Lyria, 213
 quercinus, Chiton, 287
 quercinus, Conus, 249
 quinqueplicata, Marginella, 237
 quisqualis, Livonia, 215
 quoyana, Cominella, 169
 quoyana, Pleurotomaria, 18
 Quoyia, 62
 Quoyula, 156

rackettii, Laevicardium, 331
 radians, Cellana, 31
 radians, Glycymeris, 296
 radians, Pseudochama, 324
 radians, Trivia, 83
 radiata, Cellana, 31
 radiata, Dosinia, 360
 radiata, Fissurella, 27
 radiata, Mactra, 334
 radiata, Pinctada, 302
 radiata, Siliqua, 339
 radiata, Tapes, 362
 radiata, Tellina, 340
 radiata, Tivela, 355
 radiatus, Chlamys, 313
 radiatus, Conus, 256
 radiatus, Isognomon, 302
 radiatus, Trochus, 44
 radix, Hexaplex, 138
 radula, Comptopallium, 307
 radula, Neritopsis, 52
 radula, Pterygia, 204
 radwini, Pterynotus, 141
 Raeta, 337
 rainesae, Conus maezei, 269
 ramburi, Prothalotia, 35
 ramosus, Brechites, 375
 ramosus, Chicoreus, 138
 ramosus, Plicatula, 315
 rana, Bursa, 128
 randalli, Cymbiolacca, 217
 Ranella, 124
 Rangia, 336
 rangiana, Smaragdia, 55
 ranina, Gyreneum, 124
 raninus, Strombus, 76
 ranunculus, Conus, 266
 ranzani, Cymatium, 120
 Rapa, 157
 rapa, Rapa, 157
 Rapana, 149
 raphanula, Duplicaria, 276
 rapiformis, Rapana, 149
 rapulum, Tomlinia, 172
 rariflamma, Venerupis, 364
 rariforme, Cirsotrema, 69
 rarimaculata, Conus, 251
 rarispina, Murex, 130
 rarus, Clanculus, 43

rashleighana, Cypraea, 93
 rathbuni, Acesta, 320
 rathbuni, Gaza, 40
 rattus, Conus, 258
 raveneli, Pecten, 305
 raynoldiana, Natica, 109
 raysummersi, Cypraea hammondae, 92
 reclinata, Neritina, 54
 reclusiana, Polinices, 105
 Recluzia, 70
 recluzianus, Conus, 253, 254
 rectirostris, Murex, 130
 recurva, Strombina, 159
 recurvirostris, Murex, 132
 recurvum, Ischadium, 298
 recurvum, Rhinoclavis, 66
 recurvum, Conus, 272
 redimiculum, Cellana strigilis, 31
 redimita, Cypraea, 87
 reductaspiralis, Conus, 254
 reeveana, Barbatia, 293
 reeveana, Cancellaria, 225
 reeveana, Pythia, 282
 reeveanum, Trachycardium, 328
 reeveanus, Nassarius, 180
 reevei, Agaronia, 196
 reevei, Amoria, 222
 reevei, Ancilla, 196
 reevei, Annachlamys, 306
 reevei, Cellana, 31
 reevei, Cypraea, 98
 reevei, Duplicaria, 274
 reevei, Glycymeris, 196
 reevei, Mitra, 197
 reevei, Tonna, 118
 reevei, Turbo, 46
 reflexa, Chama, 323
 reflexus, Iru, 365
 regalis, Calliotropis, 36
 regenfussii, Turbo, 46
 regina, Cypraea, 97
 regina, Vexillum, 205
 regius, Conus, 267
 regius, Phyllonotus, 135
 regius, Spondylus, 316
 regularis, Ischnochiton, 284
 rehderi, Bursa, 127
 rehderi, Mitra, 201
 rehderi, Phenacovolva, 101
 remies, Tellina, 342
 reptus, Nautilus, 377
 Resania, 337
 reticularis, Oliva, 190
 reticulata, Cancellaria, 225
 reticulata, Cypraea, 97
 reticulata, Distorsio, 126
 reticulata, Nerita, 53
 reticulata, Oliva, 191
 reticulata, Periglypta, 353
 reticulata, Venerupis, 365
 reticulatus, Nassarius, 179, 180
 reticulatus, Trimusculus, 281
 retifer, Conus, 246
 retifera, Amaea, 69
 retifera, Cypraea, 96
 retusa, Lunulicardia, 330
 retusa, Mitra, 201
 retusum, Cymatium, 122
 rex, Penion, 167
 rhinoceros, Cypraea, 92
 rhinoceros, Vasum, 209
 Rhinoclavis, 66-67
 Rhinocoryne, 63
 rhizophorae, Crassostrea, 318
 rhodia, Mitra, 198
 rhodia, Primovula, 100
 rhododendron, Conus, 247
 rhodostoma, Bursa, 128
 rhodostoma, Natica, 109
 rhynchaena, Lutraria, 336
 rhyssus, Pteropurpura, 140
 ricinus, Drupa, 150
 rigida, Atrina, 300
 rigida, Ventricolaria, 353
 rigidus, Latirus, 184
 rimularis, Marcia, 363
 rimulosa, Camptonectes, 311
 ringens, Cantharus, 172
 ringens, Malea, 117
 ringens, Ringicardium, 326
 Ringicardium, 326
 riosi, Adolomelon, 218
 Rissolina, 58
 RISSOINIDAE, 58

rivularis, Circe, 354
 roadnightae, Livonia, 215
 robertsi, Cypraea, 91
 robillardii, Conus, 250
 robinsona, Aulica, 216
 robusta, Lambis, 81
 robusta, Marginella, 234
 robusta, Terebra, 277
 robustum, Dinocardium, 331
 robustus, Strombus marginatus, 79
 Roccellaria, 370
 rocquignyi, Natica, 106
 roei, Haliotis, 21
 roosevelti, Conus, 271
 roosevelti, Marginella, 234
 roosevelti, Terebra, 277
 rosa, Bursa, 129
 rosacea, Haliotis, 20
 rosalinus, Clavus, 242
 rosarium, Hexaplex, 134
 rosea, Amalda, 195
 rosea, Enigmonia, 317
 rosea, Fissurella, 27
 rosea, Harpa, 212
 rosea, Maoricolpus, 59
 rosea, Marginella, 236
 roseatus, Phos, 168
 roseomaculata, Pupa, 278
 roseoradiata, Foralepas, 27
 roseum, Gyreneum, 125
 roseus, Pitar, 357
 rosewateri, Calliostoma bairdii, 38
 rosselli, Cypraea, 95
 rossiniana, Cymbiola, 217
 rossiteri, Chicoreus, 137
 rostrata, Acreuciroa, 375
 rostrata, Cuspidaria, 374
 rostrata, Laternula, 372
 rostrata, Mactra, 336
 rostrata, Spengleria, 370
 rostrata, Tellina, 340
 rostratus, Donax, 345
 rota, Cellana, 31
 rota, Homalocantha, 139
 rotularia, Astraea, 51
 rotunda, Distorsio, 126
 rotundata, Pliodonta, 322
 rotundata, Paphia, 364
 royanum, Phalium pyrum, 113
 rubeculum, Cymatium, 123
 ruber, Haliotis, 21
 rubescens, Chicoreus, 137
 rubeta, Bursa, 127
 rubicunda, Charonia, 119
 rubicundum, Trachycardium, 328
 rubidus, Murex, 131
 rubiginea, Mitra, 199
 rubiginosa, Ancilla, 196
 rubiginosa, Cymbium, 215
 rubiginosus, Calliostoma, 37
 rubiginosus, Chicoreus, 137
 rubiginosus, Conus, 248
 rubra, Emarginula, 24
 rubra, Stomatolina, 44
 rubra, Tonicella, 285
 rubra, Ungulina, 322
 rubritincta, Mitra, 199
 rubrolabiata, Oliva, 192
 rubropicta, Chama, 323
 rubropicta, Semele, 350
 rubuscaesius, Drupa, 151
 ruckeri, Cymbiola, 217
 rude, Priene, 124
 rudis, Fissurella, 28
 rudis, Pinna, 300
 rudis, Pitar, 356
 rudis, Pododesmus, 317
 rudis, Solen, 338
 Ruditapes, 363, 365
 rudolphi, Purpura, 146
 ruepelli, Diodora, 26
 rufa, Cypraea, 95
 rufa, Cypraeacassis, 111, 378
 rufa, Natica, 106
 rufanensis, Nassarius, 180
 rufescens, Haliotis, 19
 rufescens, Mactra, 334
 rufimaculosus, Conus, 262
 rufofulgurata, Oliva, 192
 rufula, Oliva, 192
 rugata, Cassidula, 281
 rugatus, Lepidopleurus, 284
 rugosa, Anachis, 160

- rugosa, Eastonia, 336
 rugosa, Galeodea, 114
 rugosa, Lambis, 82
 rugosa, Nucula, 289
 rugosa, Pinna, 300
 rugosa, Sinovacula, 349
 rugosa, Tellina, 343
 rugosa, Thais, 148
 rugosum, Chlorostoma, 42
 rugosum, Vexillum, 205
 rugosus, Donax, 345
 rugosus, Strombus, 77
 rugosus, Tectarius, 58
 ruizana, Limopsis, 295
 rumphii, Cellana, 31
 rumphii, Nerita polita, 53
 rumphii, Pleurotomaria, 18
 Rupellaria, 368-369
 rupestris, Fulgoraria, 221
 rupicollina, Astraea, 50
 ruppellii, Cerithium, 65
 ruschenbergi, Chlamys, 311
 russa, Vexillum, 208
 rustica, Columbella, 161
 rustica, Latirolagena, 183
 rustica, Thais, 148
 rusticoides, Columbella, 161
 rusticus, Tectarius, 58
 rutila, Cymbiola, 217
 rutilum, Cymatium, 121
 rutilus, Conus, 264

 saburon, Phalium, 113
 saccata, Streptopinna, 300
 saccharina, Patelloida, 33
 Saccostrea, 318
 sacellum, Thais, 148
 safiana, Patella, 29
 sagamiensis, Neverita, 102
 sagittatus, Conus, 263
 sakurii, Cypraea, 91
 salebrosa, Vitularia, 144
 salebrosum, Cerithium, 65
 salisburyi, Fusinus, 187
 sallasi, Murex, 131
 salmiana, Pleurotomaria, 18
 salmo, Pleuroploca, 182
 salmonea, Favaria, 144
 saltatrix, Chicoreus rossiteri, 137
 Samarangia, 359
 samarensis, Strombus, 78
 sandwichensis, Conus suturatus, 249
 sandwichensis, Oliva, 192
 sanfelipensis, Anachis, 161
 sanguifluus, Latirus, 184
 sanguinea, Haliotis, 21
 sanguinea, Turritella, 60
 sanguineus, Conus, 271
 Sanguinolaria, 347-348
 sanguinolenta, Exellichlamys, 308
 sanguinolenta, Oliva, 191
 sanguinolenta, Polinices, 104
 sanguinolenta, Sanguinolaria, 347
 sanguinolentus, Cantharus, 172
 sanguinolentus, Conus, 259
 sanguisugum, Vexillum, 206
 sanibelensis, Crassispira, 243
 santa, Gerdiella, 231
 santacruzensis, Latiaxis, 155
 santarosana, Murexiella, 143
 santoensis, Lyria, 214
 sapotilla, Marginella, 235
 sarcodes, Cypraea, 97
 sarcostomum, Cymatium, 123
 sarda, Chama, 323
 sarda, Marginella, 237
 sarmaticus, Turbo, 47
 sarsi, Aporrhais, 75
 Sassia, 123-124
 satura, Neptunea, 165
 saturata, Cypraea, 96
 saulae, Cypraea, 90
 sauliae, Charonia, 119
 saulii, Chicoreus, 136
 saxatilis, Hexaplex, 134
 saxicolum, Entodesma, 373
 Saxidomus, 359
 Saxostrea, 318
 saxosus, Turbo, 48
 sayana, Oliva, 190
 sayanum, Calliostoma, 39
 sayi, Diodora, 25
 sazanka, Conus, 248
 scaber, Conus, 260

 scabra, Collisella, 33
 scabra, Lima, 319
 scabra, Littorina scabra, 57
 scabra, Semele, 350
 Scabricola, 202
 scabricosta, Nerita, 54
 scabricostata, Chlamys, 313
 scabricula, Pterygia, 205
 scabrusculus, Conus, 248
 scabrum, Priene, 124
 Scaeolea, 290
 scalare, Epitonium, 68
 scalariforme, Buccinum, 174
 scalariformis, Phyllocoma, 149
 scalariformis, Scalptia, 226
 scalarina, Katelysia, 363
 scalarina, Scalptia, 229
 scalaris, Dosinia, 361
 scalaris, Haliotis, 20
 scalata, Scalptia, 225
 Scalptia, 225-226, 228-230
 scapha, Anadara, 292
 scapha, Cymbiola, 216
 Scaphander, 279-280
 Scaphella, 223-224
 SCAPHOPODA, 282-283
 scarabaeus, Pythia, 282
 scethra, Natica, 107
 schepmani, Conus, 264
 schilderiana, Cypraea, 97
 schilderorum, Cypraea, 98
 Schizodesma, 336
 schmalzi, Pleurotomaria, 18
 schmitti, Scaphella, 223
 schrammi, Anodontia, 321
 schrenckii, Notoacmea, 32
 schroederi, Calliostoma, 39
 Scissodesma, 336
 scissurata, Yoldia, 290
 sclateria, Amoria, 222
 scobinata, Tellina, 343
 scolopax, Murex, 129, 130
 Sconsia, 114-115
 scordalus, Paphia, 364
 scorpio, Homalocantha, 139
 scorpius, Lambis scorpius, 81
 scortum, Hecuba, 346
 scottii, Cypraea, 94
 scripta, Circe, 354
 scripta, Mitrella, 161
 Scrobicularia, 350
 SCROBICULARIIDAE, 350
 scrobiculator, Bursa, 127
 scrobiculatus, Nautilus, 377
 scrobilator, Bursa, 127
 sculleti, Conus, 251
 scurra, Cypraea, 96
 Scurria, 32
 scutella, Amblychilepas, 27
 scutellaris, Patella, 30
 scutellatum, Crucibulum, 73
 Scutus, 24
 Searlesia, 169
 sebae, Lambis truncata, 82
 sebae, Polinices, 104
 sebastiani, Marginella, 233
 secta, Macoma, 344
 secundus, Homalocantha, 139
 segravel, Conus, 261
 selecta, Maurea, 40
 sella, Placuna, 317
 Semele, 350
 SEMELIDAE, 349-350
 semicostata, Astraea, 50
 semidecussata, Ruditapes, 365
 semidisjuncta, Trigonostoma, 229
 semifasciatum, Vexillum, 207
 semiferrugineum, Cerithium, 65
 semigranosum, Phalium, 113
 semigranosum, Rhinoclavis, 66
 seminodosa, Nassarius, 181
 seminuda, Atrina, 300
 semiobliterata, Dosinia, 361
 semiorbiculata, Beguina, 324
 Semipallium, 308
 semipellucida, Nipponaphera, 228
 semiplicata, Haliotis, 23
 semiplicata, Vanikoro, 71
 semiplota, Cypraea, 85
 semipolita, Cochlespira pulchella, 240
 semistriata, Haliotis, 22
 semistriolatum, Dentalium, 283
 semitorta, Sassia, 123
 semitorta, Trisidos, 294

 senatoria, Chlamys, 309
 senegalense, Dentalium, 283
 senegalensis, Aporrhais, 75
 senegalensis, Cancilla, 203
 senegalensis, Cardita, 324
 senegalensis, Nerita, 53
 senegalensis, Siratus, 133
 senegalensis, Terebra, 273
 senegalensis, Venerupis, 364
 senegalica, Cypraeacassis testiculus, 111
 senhousia, Musculus, 298
 Senilia, 292
 senilis, Senilia, 292
 sennottorum, Conus, 267
 senticosum, Trachycardium, 327
 senticosus, Phos, 168
 sentis, Chlamys, 314
 sentix, Latiaxis, 156
 Separatista, 71
 Sepia, 376-377
 SEPIIDAE, 376-377
 Septaria, 56
 septemradiatum, Pseudamussium, 311
 Septifer, 298
 septimus, Strombus marginatus, 79
 sericata, Ericusa, 214
 sericata, Glycymeris, 295
 sericea, Oliva, 190
 sericeus, Pecten, 305
 serotinus, Cyrtulus, 183
 serpentina, Cymbiola, 218
 serpentina, Scabricola, 202
 serra, Donax, 346
 serrata, Atrina, 300
 serrata, Scalptia, 229
 Serratovola, 304, 308
 serresianus, Aporrhais, 75
 serricostatum, Trachycardium, 328
 Serripes, 332-333
 serra, Nassa, 150
 sertata, Natica, 107
 setigericosta, Anadara, 293
 setosum, Plagiocardium, 332
 setosus, Turbo, 46
 sewelli, Ficus, 117
 sharoni, Cypraea, 87
 shinagawensis, Calliostoma, 35
 siasiensis, Cypraea, 90
 sibalaldi, Strombus plicatus, 78
 sibogae, Conus, 263
 sibogai, Propeamussium, 303
 sicarius, Solen, 338
 sicula, Emarginula, 24
 sidelia, Oliva, 191
 sieboldii, Conus, 251
 Sigaluta, 220
 Sigaretotrema, 103
 Sigatica, 105
 signae, Conus, 272
 signata, Cypraea, 91
 signata, Nerita, 53
 signatum, Cyphoma, 100
 significans, Bartschia, 172
 Siliqua, 339-340
 siliqua, Ensis, 338
 siliqua, Iru, 365
 Siliquaria, 61
 SILIQUARIIDAE, 61
 similis, Cancellaria, 226
 similis, Cypraea, 86
 similis, Marginella, 234
 similis, Spisula solidissima, 335
 simillima, Distorsio, 126
 Simnia, 100
 simplex, Anomia, 317
 simplex, Conus algoensis, 266
 simplex, Mitra, 198
 simpsoni, Pitar, 356
 sinense, Cymatium, 123
 sinensis, Callista, 358
 sinensis, Cancellaria, 226
 sinensis, Diminova, 99
 sinensis, Dosinia, 360
 sinensis, Oxystele, 43
 sinensis, Pecten, 305
 sinensis, Pterygia, 204
 sinensis, Rhinoclavis, 66
 sinensis, Semele, 350
 sinensis, Spondylus, 316
 sinensis, Xenophora, 74
 singaporina, Volachlamys, 308
 singleyi, Cyclinella, 362
 Sinistralia, 189
 Sinovacula, 349

 sinuatus, Lambis, 81
 sinuatus, Strombus, 76
 Sinum, 103-104
 sinuosa, Chama, 323
 sinuosa, Paphia, 363
 Siphonalia, 166
 Siphonaria, 281
 Siphonochelus, 157
 Siphonofusus, 166
 Siphonorbis, 163
 Siphovasmus, 209
 siquijorensis, Nassarius, 180
 Siratus, 131-134
 Smaragdia, 55
 Smaragdinella, 280
 smaragdinus, Perna, 297
 smaragdula, Latirolagena, 183
 smaragdus, Lunella, 48
 smirna, Conus, 261
 smirnia, Neptunea, 165
 smithae, Panopea, 371
 smithi, Cypraea, 89
 smithi, Distorsio, 126
 smithi, Subsimnia, 100
 smithi, Teramachia, 224
 soaresi, Conus, 265
 sobrinus, Murex, 130
 socorroensis, Latirus, 186
 solanderii, Sunettina, 355
 solandri, Conus, 248
 solandri, Trivia, 83
 solarioides, Xenophora, 74
 solaris, Stellaria, 74
 SOLECURTIDAE, 348-349
 Solecurtus, 348
 Solemya, 289
 SOLEMYIDAE, 289
 Solen, 338-339
 SOLENIDAE, 338-339
 soleniformis, Papyridea, 329
 Solenosteira, 172
 solida, Cancellaria, 227
 solida, Hiatala, 347
 solida, Nassaria, 167
 solida, Natica, 106
 solida, Semele, 350
 solida, Spisula, 336
 solidissima, Spisula, 335
 solidula, Pupa, 278
 solidula, Zierlana, 208
 solidulus, Argopecten, 307
 solidum, Dalium, 116
 solidus, Conus, 246
 solitaria, Haminoea, 279
 soluta, Akera, 280
 sontica, Cellana, 31
 sophia, Cymbiola, 218
 sophia, Phalium bisulcatum, 112
 sophiae, Mitra, 200
 sordida, Polinices, 105
 sordidus, Polinices, 102
 sorense, Haliotis, 20
 souliei, Cymbium, 215
 souverbii, Colubraria, 173
 soverbii, Fimbria, 322
 sowerbyana, Cypraea cylindrica, 90
 sowerbyi, Conus, 258
 sowerbyi, Cypraea, 87
 sowerbyi, Ericusa, 215
 sowerbyi, Lima, 319
 sowerbyi, Lioconcha, 359
 soyoae, Calliostoma, 40
 sozoni, Conus, 268
 spadicea, Bursa, 127
 spadicea, Cypraea, 88
 spadicea, Haliotis, 21
 spadicea, Natica, 106
 spadiceus, Latirus, 186
 sparta, Tractolira, 219
 sparverius, Turbo, 47
 spathuliterus, Spondylus, 317
 speciosa, Eucrasatella, 326
 speciosa, Gemmula, 238
 speciosa, Haliotis, 23
 speciosa, Thais, 148
 speciosa, Tricola, 52
 speciosa, Trigonocardia, 329
 speciosum, Cryptopecten, 309
 speciosum, Vexillum, 208
 speciosus, Nassarius, 180
 spectabilis, Exellichlamys, 308
 spectabilis, Mactra, 334
 spectrum, Chicoreus, 136
 spectrum, Conus, 256

- spengleri, Cabestana, 125
 spengleri, Scissodesma, 336
 spengleri, Tellina, 340
 Spengleria, 370
 spengleriana, Cancellaria, 226
 sphaera, Neritina, 54
 sphaerula, Angaria, 51
 sphaerulata, Neocancilla, 203
 sphinx, Conus, 267
 spicata, Oliva, 190
 spiceri, Comptopallium, 307
 spiceri, Conus coelinae, 253
 spinella, Cassis madagascariensis, 110
 spinicinctum, Columbarium, 158
 spinifera, Patella, 30
 spinigera, Calliostoma, 40
 spinosa, Acanthocardia, 327
 spinosa, Bursa, 128
 spinosa, Cassis, 110
 spinosa, Latiaxis pagodus, 156
 spinosa, Peristernia, 187
 spinosa, Saccostrea, 318
 spinosa, Theodoxus, 55
 spinosum, Crucibulum, 73
 spiralis, Cantharus, 171
 spirata, Babylonia, 173
 spirata, Cancellaria, 226
 spirata, Eglisia, 70
 spirata, Rissoina, 58
 spirata, Vermicularia, 61
 spiratum, Busycon, 176
 spirillus, Tudicla, 210
 Spirula, 377
 spirula, Spirula, 377
 SPIRULIDAE, 377
 Spisula, 335–336
 spitzbergeni, Colus, 162
 splendens, Haliotis, 19
 spendens, Terebra, 273
 splendidula, Oliva, 190
 splendidulus, Conus, 262
 Splendrillia, 243
 SPONDYLIDAE, 316–317
 spondyloides, Pedum, 315
 spondyloideum, Pedum, 315
 Spondylus, 316–317
 sponsalis, Conus sponsalis, 261
 springeri, Calliostoma, 39
 springeri, Siratus, 132
 spuma, Callista, 357
 spurca, Cypraea, 85
 spuria, Pterygia, 204
 spurius, Conus, 267
 squalida, Megapitaria, 359
 squalida, Tellina, 340
 squama, Siliqua, 339
 squamata, Chlamys, 312
 squamata, Haliotis, 21, 23
 squamata, Siliqua, 61
 squamosa, Anomalocardia, 366
 squamosa, Chlamys, 312
 squamosa, Haliotis, 23
 squamosa, Lima, 319
 squamosa, Tridacna, 333
 squamosus, Chiton, 288
 squamosus, Latirus, 184
 squamosus, Modiolus modiolus, 299
 squamosus, Spondylus, 317
 stagnalis, Ellobium, 282
 stainforthi, Chicoreus, 134
 stainforthi, Vexillum, 206
 stainforthii, Conus, 261
 staminea, Protothaca, 368
 stangeri, Gari, 346
 staphylaea, Cypraea, 85
 staurella, Tellina, 341
 stearnsii, Arctomelon, 221
 stearnsii, Cellana, 31
 stearnsii, Conus jaspideus, 270
 steeriae, Chicoreus, 136
 stegeri, Fusinus, 189
 stellaformis, Patella, 30
 Stellaria, 74
 stellaris, Patelloida, 33
 stellata, Natica, 106
 stellatum, Columbarium, 158
 Stenoplax, 284–285
 stephanucha, Vexillum, 207
 stercoraria, Cypraea, 96
 stercusmuscarum, Conus, 260
 stercusmuscarum, Natica, 109
 stercuspulicem, Ampulla, 224
 sterna, Pteria, 301
 Sthenorytis, 70
 stictica, Mitra, 197
 stigmataria, Vexillum, 206
 stigmaticus, Conus, 263
 Stigmaulax, 109
 stillatus, Conus spectrum, 256
 stimpsoni, Colus, 163
 stimpsoni, Conus, 270
 stimpsoni, Dentalium entale, 283
 stimpsoni, Trigonostoma, 229
 stokesii, Chiton, 288
 stolidia, Cypraea, 93
 Stomatella, 44
 STOMATELLIDAE, 44
 Stomatia, 44
 Stomatolina, 44
 storeria, Marginella, 234
 straminea, Polinices, 105
 stramineus, Conus, 262
 stramineus, Heliculus, 62
 Stramonitrophon, 152
 strangei, Comptopallium, 307
 strangei, Polinices, 102
 strangulatus, Brechites, 375
 Streptopinna, 300
 striata, Acteocina, 338
 striata, Bulla, 279
 striata, Collisella, 33
 striata, Cryptoplax, 287
 striata, Marcia, 363
 striata, Martesia, 372
 striata, Myadara, 373
 striata, Nerita, 53
 striata, Pisanina, 170
 striata, Sconsia, 114
 striata, Terebra, 275
 striatella, Vexilla, 150
 striatellus, Conus, 254
 striatissimum, Buccinum, 174
 striatula, Chamelea, 367
 striatula, Emarginula, 24
 striatula, Tellina, 342
 striatus, Camptonectes, 311
 striatus, Conus, 255
 striatus, Donax, 345
 striatus, Jujubinus, 41
 strictus, Solen, 339
 strigata, Atys naucum, 279
 strigata, Marginella, 232, 236
 strigata, Terebra, 277
 strigatum, Phalium, 111
 strigillatus, Solecurtus, 348
 strigilis, Cellana, 31
 Strigilla, 343
 strigillatus, Solecurtus, 348
 strigillinus, Circumphalus, 353
 strigosa, Katelaysia scalarina, 363
 strigosa, Stomatella, 44
 strigosa, Tellina, 342
 strigosa, Vexillum, 205
 striolatus, Diloma, 42
 STROMBIDAE, 75–83
 strombiformis, Columbella, 160
 Strombina, 159
 Strombus, 75–81
 strongi, Agatrix, 229
 Struthiolaria, 75
 STRUTHIOLARIIDAE, 75
 stuarti, Boreotrophon, 152
 stuerdi, Ternivolula, 213
 stultorum, Mactra, 334
 stultorum, Tivela, 356
 stupella, Conus, 261
 sturnus, Notoacmea, 32
 stutchburyi, Chione, 365
 stylata, Hastula, 274
 suavis, Ancilla, 195
 subangularis, Strombina, 159
 subangulata, Minolia, 34
 subantarctica, Chlamys, 313
 Subcancilla, 203
 subcrenata, Anadara, 293
 subcylindrica, Cypraea, 90
 subdiaphana, Compsoyax, 362
 subdistortum, Cymatium, 122
 subdivisum, Vexillum, 206
 subequilatera, Astarte crenata, 325
 subimbricata, Chione, 367
 subintermedia, Ficus, 117
 submarmoreus, Tonicella, 285
 Subnifella, 48
 subnodosus, Lyropecten, 315
 Subpterynotus, 141
 subretusa, Lunulicardia, 330
 subrosea, Dosinia, 361
 subrostrata, Chione, 365
 subrostrata, Triumphis, 172
 subrufa, Pilosabia, 72
 subrugosa, Anomalocardia, 366
 subrugosum, Trachycardium, 328
 Subsimia, 100
 substriatum, Laevicardium, 332
 subsulcata, Neritodryas, 55
 subteres, Cypraea, 93
 subtexturata, Pterygia, 204
 subtriangulata, Paphies, 337
 subtruncata, Spisula, 336
 subulata, Clypeolum, 56
 subulata, Terebra, 273
 subulatus, Conus subulatus, 249
 subviridis, Cypraea, 88
 succincta, Gelagna, 125
 succinctus, Chione, 366
 succinctus, Strombus marginatus, 79
 succineoides, Polinices, 104
 sufflatus, Nassarius, 181
 suffusa, Conus marmoreus, 244
 suffusa, Lucapina, 26
 suffusa, Terebra, 273
 sulcata, Astarte, 326
 sulcata, Chlamys, 311
 sulcata, Conus, 246
 sulcata, Cookia, 48
 sulcata, Corbula, 369
 sulcata, Nucula, 289
 sulcata, Oocorys, 116
 sulcata, Pyramidella, 277, 278
 sulcata, Strombus, 79
 sulcata, Terebralia, 64
 sulcataria, Mactra, 334
 sulcatus, Chiton, 288
 sulcatus, Conus, 252, 263
 sulcatus, Planaxis, 62
 sulcatus, Stigmaulax, 109
 sulcidentata, Cypraea, 98
 sulcosa, Anadara, 292
 sulcosa, Paphia, 364
 sulcosa, Phalium granulosum, 113
 sulcosa, Tonna, 118
 sumatrensis, Conus, 250
 summersi, Cypraea, 92
 Sunetta, 354–355
 Sunettina, 355
 superba, Giza, 40
 superba, Nucula, 289
 superbiens, Vexillum, 205
 superbus, Anguipecten, 312
 superbus, Siratus, 133
 superstes, Cypraea, 90
 supertexta, Haliotis, 21
 suratensis, Conus, 250
 Surculina, 225
 surinamensis, Cypraea, 84
 suturale, Cerithium, 65
 sutureatus, Conus sutureatus, 249
 swainsoni, Alcihoe, 220
 swainsoni, Mitra, 199
 swifti, Swiftopecten, 306
 swiftiana, Corbula, 370
 Swiftopecten, 306
 symbolicum, Campanile, 68
 syracusanus, Fusinus, 189
 Syrinx, 176
 tabescens, Cypraea, 93
 tabularis, Natica, 108
 tabularis, Patella, 30
 tabulata, Neptunea, 165
 tabulatum, Cymatium, 121
 taeniata, Natica, 109
 taeniata, Vexilla, 150
 taeniatum, Clavocerithium, 68
 taeniatum, Vexillum, 205
 taeniatum, Conus, 260
 tageliformis, Macoma, 344
 Tagelus, 349
 taitensis, Conus, 258
 taiwanica, Lyria, 214
 taiwanum, Dentalium, 283
 tajima, Limopsis, 294
 takahashii, Latiaxis, 154
 takiisaoi, Neocancilla, 203
 talpa, Cypraea, 96
 tampaense, Calliostoma, 37
 tampaensis, Crassispira, 243
 tampaensis, Tellina, 343
 tankervillei, Cardita, 325
 tankervillei, Amalda, 195
 tannaensis, Conus, 264
 tanneri, Diodora, 26
 Tapes, 362
 tarentina, Patella, 29
 tarentina, Pteria, 301
 taslei, Conus, 266
 tasmaniae, Foralepas, 27
 tasmanica, Foralepas, 27
 tasmanica, Notochlamys, 306
 Tasmeuthria, 169
 tatei, Xenophora, 74
 taurina, Terebra, 276
 taurus, Strombus, 76
 Tawera, 366
 tawhitirahia, Polinices, 101
 tayloriana, Galeostrea, 51
 tayloriana, Haliotis, 22
 taylorianum, Vexillum, 206
 tecta, Astraea, 50
 tecta, Natica, 108
 Tectarius, 58
 tectiforme, Trochocerithium, 68
 tectum, Modulor, 63
 tectumpersicum, Tectarius, 58
 Tectus, 45
 Tegula, 42
 tegula, Nassarius, 179
 tehuelcha, Olivella, 194
 tehuelchana, Olivella, 194
 tehuelchus, Chlamys, 312
 tejedorii, Calliostoma, 39
 telatus, Conus, 245
 Telescopium, 64
 telescopium, Telescopium, 64
 tella, Polystira, 239
 Tellidora, 344
 Tellina, 340–343, 345
 TELLINIDAE, 340–345
 tellinoides, Sanguinolaria, 347
 tendineus, Conus, 264
 tenellus, Conus, 248
 tenera, Lima, 319
 tenerima, Protothaca, 368
 tenerum, Trigonostoma, 229
 tenoceras, Leucosyrinx, 240
 tenue, Buccinum, 174
 tenuifolium, Cerithium, 65
 tenuiluratum, Cymatium, 123
 tenuis, Atrina, 300
 tenuis, Bullia, 177
 tenuis, Cyclinella, 362
 tenuis, Cypraea, 111
 tenuis, Tellina, 343
 tenuis, Xenophora, 74
 tenuisculptum, Rhinoclavis, 67
 tenuistriatus, Conus, 248
 tenuiviricosus, Siratus, 134
 Teramachia, 224
 teramachii, Acreuciroa, 375
 teramachii, Conus, 251
 teramachii, Cypraea, 89
 teramachii, Pleurotomaria, 18
 terebellatus, Strombus terebellatus, 78
 terebelloides, Pyramidella, 277
 Terebellum, 83
 terebellum, Pyramidella dolabrata, 277
 terebellum, Terebellum, 83
 Terebra, 273–277
 terebra, Conus, 248
 terebra, Turritella, 59
 Terebralia, 64
 Terebratulina, 378
 TEREBRIDAE, 273–277
 tereinus, Pecten, 305
 Teremelon, 220
 teres, Cypraea, 93
 teres, Lithophaga, 299
 terminus, Conus, 255
 ternatanus, Hemifusus, 176
 ternispina, Murex, 129
 Ternivolula, 213
 teschi, Ptychosyrinx timorensis, 238
 tessellata, Apha, 230
 tessellata, Cassis, 110
 tessellata, Cypraea, 84
 tessellata, Ficus, 117
 tessellata, Melo, 215
 tessellata, Mitra, 197
 tessellata, Monodonta, 41
 tessellata, Natica, 107
 tessellata, Nerita, 52
 tessellata, Oliva, 190
 tessellata, Pyramidella sulcata, 278
 tessellata, Tricilia, 52
 tessellatus, Conus, 249

- tessulatus, *Conus*, 249
testacea, *Agaronia*, 196
testiculus, *Cypraeacassis testiculus*, 111
testudinalis, *Collisella*, 32
testudinaria, *Cellana*, 31
testudinaria, *Cypraea*, 96
testudinarius, *Cymatium*, 123
testudinarius, *Conus*, 268
tetragona, *Arca*, 292
tetrica, *Lima lima*, 319
teulerei, *Cypraea*, 94
TEUTHOIDEA, 377
texana, *Mercenaria mercenaria*, 368
texasiana, *Agriopoma*, 359
textile, *Conus*, 244, 245
textile, *Paphia*, 364
textilina, *Oliva*, 190
textilis, *Collisella*, 33
textilis, *Nerita*, 54
textilis, *Scalptia*, 229
textrix, *Paphia*, 364
textum, *Phos*, 168
texturata, *Pterygia*, 205
texturata, *Venerupis*, 363
thaanumi, *Codakia*, 321
thaanumi, *Mirapecten*, 315
thaanumi, *Terebra*, 275
thaanumiana, *Mitra*, 197
thaca, *Protothaca*, 367
thailandis, *Conus colubrinus*, 246
Thais, 146–148
thalassiarachus, *Conus*, 251
Thalotia, 41
thatcheri, *Cymbiolacca*, 217
thatcheri, *Cypraea*, 94
Thatcheria, 243
THATCHERIIDAE, 243
Theodoxus, 55
thersites, *Cymatium*, 121
thersites, *Cypraea friendii*, 94
thersites, *Nassarius*, 181
thersites, *Strombus*, 76
thomae, *Bursa*, 128
thomae, *Conus*, 253
thomasi, *Chicoreus*, 138
thomasi, *Conus*, 248
thomasi, *Cypraea*, 86
thomasiana, *Rapana*, 149
thompsoni, *Eudolium*, 119
thompsoni, *Siratus articulatus*, 131
thomsoni, *Phalium*, 114
Thracia, 374
thraciaciformis, *Yoldia*, 290
THRACIIDAE, 374
tiara, *Placamen*, 367
tiaratus, *Conus*, 271
tiarella, *Mitra*, 200
TIARIDAE, 64
tiarula, *Nassarius*, 179
Tibia, 82
tibiaciformis, *Teramachia*, 224
ticaonius, *Turbo*, 46
tigerina, *Codakia*, 321
tigrum, *Terebra*, 273
tigrina, *Burnupena papyracea*, 170
tigrina, *Cypraea*, 97
tigrina, *Natica*, 109
tigrina, *Oliva*, 190, 191
tigrina, *Turritella*, 60
tigrinum, *Cymatium*, 120
tigrinum, *Terebra*, 273
tigrinus, *Camptonectes*, 311
tigrinus, *Conus*, 245
tigris, *Cypraea*, 97, 378
tigris, *Maurea*, 40
tigris, *Semipallium*, 308
timessus, *Fusinus*, 189
Timoclea, 362
timorensis, *Conus*, 262
timorensis, *Ptychosyrinx*, 238
tincta, *Chlamys*, 312
tincta, *Pisania*, 170
tinctilis, *Margovola*, 99
tindalli, *Amalda*, 195
tinianus, *Conus*, 266
tissoti, *Thais*, 147
Tivela, 355–356
tokaiensis, *Siphonalia*, 166
tokioi, *Phenacovolva*, 101
toleranda, *Pterygia*, 204
tomlini, *Abyssosyrinx*, 56
tomlini, *Cypraea*, 85
Tomlinia, 172
tongana, *Tellina*, 340
Tonicella, 285
Tonicia, 285
Tonna, 118
TONNIDAE, 117–119
Torellia, 71
toreuma, *Venus*, 353
tornata, *Turricula*, 243
tornatilis, *Acteon*, 278
tornatus, *Conus*, 272
torquatus, *Conus*, 251
torrefactus, *Chicoreus*, 136
torrei, *Ischnochiton*, 284
torrei, *Volutifusus*, 223
torri, *Godfreyia*, 175
torrida, *Xenophora*, 74
torta, *Trisidos*, 294
tortilis, *Latiaxis*, 153
tortilis, *Ovula*, 99
tortuosa, *Colubraria*, 173
tortuosa, *Trisidos*, 294
tortuosus, *Colus*, 163
torulosa, *Turritella*, 60
torulosa, *Vexillum*, 208
torva, *Pyrene*, 161
tosaensis, *Natica*, 109
townsendi, *Chlamys*, 309
townsendi, *Donax*, 345
Trachycardium, 327–330
Tractolira, 219
traillii, *Natica*, 106
Trajana, 167
tramoserica, *Cellana*, 31
tranquebarica, *Volachlamys*, 308
tranquebaricum, *Cymatium*, 121
tranquebaricus, *Cantharus*, 171
transenna, *Homalopoma*, 48
translucens, *Chiton*, 287
transpositum, *Vexillum*, 205
transversa, *Anadara*, 292
trapa, *Murex*, 130
TRAPEZIIDAE, 351
Trapezium, 351
trapezium, *Pleuroploca*, 182
travassosi, *Agaronia*, 196
traversianus, *Conus*, 262
tremperiana, *Megasurcula*, 241
trenberthae, *Cypraea*, 90
Tresus, 337
trialata, *Pteropurpura*, 142
triangularis, *Tripterotyphus*, 157
triangulata, *Morula*, 148
triangulatus, *Boreotrophon*, 152
tribblei, *Conus*, 253
tribulus, *Murex*, 130
tricarinata, *Hemitoma*, 25
tricarinata, *Serratovola*, 304
tricarinata, *Turritella*, 59
tricarinatus, *Euchelus*, 34
TRICHOTROPIDAE, 71
Trichotropis, 71
tricincta, *Marginella*, 237
Tricolia, 52
tricolor, *Calliostoma*, 37
tricolor, *Cardita*, 325
tricolor, *Oliva*, 191
tricolor, *Terebra*, 275
tricornis, *Murex elenensis*, 132
tricornis, *Strombus*, 76
tricotilis, *Haliotis*, 20
TRIDACNA, 333
TRIDACNIDAE, 333
tridentata, *Cavolinia*, 280
triiformis, *Pterynotus*, 140
trigona, *Pilosabia*, 72
TRIGONIIDAE, 320
Trigoniocardia, 329
Trigonostoma, 229–230
Trigonostoma, *Trigonostoma*, 229
trigonulus, *Naquetia*, 133
trigonom, *Cymatium*, 122
trigonus, *Conus*, 250
trigonus, *Pythia*, 282
trilineata, *Pandora*, 372
Trimusculus, 281
trinidadensis, *Nerita*, 53
tripartita, *Gari*, 346
tripla, *Tivela*, 355
triplicata, *Archimediella*, 59
triplicata, *Mitra*, 198
Tripterotyphus, 157
tripterus, *Pterynotus*, 140
tripus, *Cymatium*, 122
triquetra, *Naquetia*, 133
triquetra, *Parastarte*, 362
triradiata, *Marcia*, 363
triradiatus, *Camptonectes*, 311
triremis, *Murex*, 129
triserialis, *Latirus*, 186
triserialis, *Thais*, 148
triseriata, *Terebra*, 274
Trisidos, 294
trispinosa, *Diacria*, 280
tristicha, *Compsodrilus*, 242
tristichus, *Pterynotus*, 140
tristis, *Marcia*, 363
tristis, *Puperita*, 55
tritoniformis, *Nassarius*, 178
tritonis, *Charonia*, 119
triumphans, *Guildfordia*, 49
Triumphis, 172
Trivia, 83
trivialis, *Chicoreus*, 137
TRIVIIDAE, 83
trivittatus, *Nassarius*, 179
trizonalis, *Vexillum*, 208
Trochia, 145
TROCHIDAE, 34–35
trochiformis, *Nodilittorina*, 58
Trochita, 73
Trochocerithium, 68
trochulus, *Conus*, 265
trochulus, *Siphonalia*, 166
Trochus, 44–45
Trophon, 152–153
Trophonopsis, 151–152
troscheli, *Dosinia*, 361
troscheli, *Murex*, 129
Trubatsa, 157
Truncaria, 170
truncata, *Barnea*, 371
truncata, *Imbricaria*, 204
truncata, *Lambis truncata*, 82
truncata, *Laternula*, 372
truncata, *Mya*, 369
truncata, *Pisania*, 170
truncata, *Solen*, 339
truncata, *Sunetta*, 355
truncatum, *Vasum*, 209
truncatus, *Boreotrophon*, 152
trunculus, *Donax*, 345
trunculus, *Hexaplex*, 134
tryoni, *Murex*, 131
tuba, *Hemifusus*, 176
tuber, *Astraea*, 50
tuberculata, *Acanthocardia*, 327
tuberculata, *Fusinus*, 187
tuberculata, *Gyrineum*, 125
tuberculata, *Haliotis*, 20
tuberculata, *Limaria*, 319
tuberculata, *Neorapana*, 146
tuberculata, *Nodilittorina*, 58
tuberculata, *Vexillum*, 208
tuberculatus, *Chiton*, 287
tuberculosa, *Atrina*, 300
tuberculosa, *Emarginula*, 24
tuberculosa, *Galeodea*, 114
tuberculosa, *Terebra*, 277
tuberculosum, *Morum*, 115
tuberosa, *Cassis*, 110
tuberosa, *Thais*, 147
tuberosum, *Bursa*, 127
tuberosus, *Fusinus*, 188
tubiferum, *Vasum*, 209
Tudicla, 210
Tudicula, 210
Tugalia, 24
Tugonia, 369
Tugurium, 73–74
tulipa, *Conus*, 247
tulipa, *Fasciolaria*, 183
tulipa, *Modiolus*, 299
tumbenzensis, *Pacipecten*, 305
tumens, *Latirus*, 185
tumens, *Pilosabia*, 72
tumens, *Pitar*, 356
tumidum, *Argobuccinum*, 125
tumidum, *Gafrarium*, 354
tumidus, *Polinices*, 102
tumorifera, *Lunulicardia*, 330
tunicata, *Katharina*, 287
turbanica, *Astraea*, 50
turben, *Vexillum*, 207
turbanata, *Monodonta*, 41
Turbinella, 210–211
TURBINELLIDAE, 208–211, 224–225
turbinellus, *Vasum*, 209
TURBINIDAE, 45–51
Turbo, 45–48
Turbonilla, 278
Turcia, 35, 40
turdus, *Cypraea*, 87
turgida, *Diplodonta*, 322
turgida, *Macra*, 334
turgida, *Tapes*, 362
turgidulus, *Colus*, 163
turneri, *Amoria*, 222
Turricula, 243
turrida, *Xenophora*, 74
TURRIDAE, 237–243
Turridrupa, 239
Turris, 239
Turrisipho, 163
turrita, *Neritina*, 54
turrita, *Strombina*, 159
Turritella, 59–60
TURRITELLIDAE, 58–61
turritus, *Conus*, 266
turritus, *Latirus*, 184
turritus, *Strombus*, 79
turtoni, *Neoberingius*, 162
tweedianus, *Murex*, 131
Typhina, 157–158
Typhisala, 158
Typhisopsis, 157
typhon, *Conus*, 264
typica, *Rupellaria*, 369
tyrra, *Angaria delphinus*, 51
tyrrhena, *Galeodea*, 114
uchidai, *Clinocardium*, 332
umbilicalis, *Gibbula*, 42
umbilicata, *Nautilus*, 377
umbilicata, *Sigaretotrema*, 103
umbilicatum, *Phalium*, 112
umbilicatus, *Melo*, 216
umbonata, *Arca*, 291
umbonella, *Callista*, 358
Umbonium, 43–44
Umbraculum, 280
umbraculum, *Umbraculum*, 280
uncinarius, *Poropteron*, 139
uncinata, *Cavolinia*, 280
undata, *Astarte*, 325
undata, *Cypraea ziczac*, 91
undata, *Glycymeris*, 296
undata, *Nerita*, 53
undata, *Terebra*, 275
undata, *Thais*, 148
undatella, *Chione*, 366
undatiruga, *Fusiturris*, 243
undatum, *Buccinum*, 174
undatus, *Fusinus*, 187
undatus, *Micromelo*, 279
undosa, *Astraea*, 50
undusus, *Cantharus*, 171
undulata, *Amoria*, 222
undulata, *Cyathodonta*, 374
undulata, *Littorina*, 57
undulata, *Natica*, 108
undulata, *Nerita*, 53
undulata, *Paphia*, 364
undulata, *Subnivalia*, 48
undulata, *Terebra*, 275
undulatum, *Phalium granulosum*, 113
undulatus, *Fusinus*, 187
undulosa, *Pterygia crenulata*, 204
unedo, *Fragum*, 329
unedo, *Gemmula*, 239
ungaricus, *Capulus*, 72
unguis, *Scutus*, 24
Ungulina, 322
UNGULINIDAE, 322–323
unicarinata, *Iphinoe*, 71
unicolor, *Pitar*, 357
unicolor, *Trachycardium*, 329
unicornis, *Acanthina*, 149
unicum, *Calliostoma*, 39
unicum, *Clinopogma*, 164
unifasciata, *Clavus*, 242
unifasciata, *Natica*, 107
unifasciatum, *Vexillum*, 206
unimaculata, *Imacava*, 242
unimaculata, *Tellina*, 340
unizonalis, *Clavus*, 242
urashimanus, *Conus*, 254
urasima, *Baryspira hinomotoensis*, 195
urceolata, *Cancellaria*, 227
urceus, *Strombus*, 77
uretai, *Olivancillaria*, 193
uropygmelana, *Anadara*, 292
Urosalpinx, 144
ursellus, *Cypraea*, 92

- ustulata, Mitra, 198
ustulata, Nerita, 54
ustulata, Peristernia, 187
utravix, Vexillum, 205
uva, Morula, 148
- vagina, Solen, 338
vaginalis, Sunetta, 355
vaginata, Limopsis, 294
vaginatus, Trophonopsis, 151
vaginiferus, Brechites, 375
valenciennesi, Payraudeautia, 105
valenciennesi, Pleuroploca, 182
valentia, Cypraea, 96
vanelli, Cypraea, 97
vanhyningi, Dinocardium robustum, 331
VANIKORIDAE, 71
Vanikoro, 71
varai, Latirus, 186
varia, Anachis, 160
varia, Cardita, 325
varia, Chlamys, 311
varia, Haliotis, 22
varia, Stomatella, 44
variabilis, Donax, 345
variabilis, Mitra, 198
variabilis, Natica, 106
variabilis, Patella, 30
variabilis, Strombus, 79
variabilis, Vexillum, 205
varians, Petaloconchus, 61
Varicospira, 82
varicosum, Cirsotrema, 69
varicosum, Terebra, 274
varicosus, Genkamurex, 157
variegata, Cardita, 324
variegata, Charonia, 119
variegata, Dosinia, 361
variegata, Ficus, 117
variegata, Phasianella, 52
variegata, Scabricola, 202
variegata, Terebra, 277
variegata, Turritella, 59
variegatum, Calliostoma, 36
variegatus, Conus, 265
variegatus, Fusinus, 188
variegatus, Ruditapes, 363
varius, Conus, 263
varius, Hexaplex, 135
Vasum, 208–210
vayssietianus, Conus, 258
vegai, Lyria, 214
velata, Barbatia, 293
velata, Placiphorella, 285
velata, Anachis, 160
veleroae, Morum, 115
velesiana, Ancillista, 194
velum, Hydatina, 279
velum, Solemya, 289
Velutina, 83
velutina, Velutina, 83
VENERIDAE, 352–369
veneriformis, Gomphina, 364
Venerupis, 363–365
venilia, Columbella, 160
venosa, Rapana, 149
Ventricularia, 353
ventricosa, Arca, 291
ventricosa, Bursa, 128
ventricosa, Ficus, 116
ventricosa, Harpa, 211
ventricosa, Marginella, 237
ventricosa, Milda, 278
ventricosa, Neptunea, 164, 165
ventricosa, Paphies, 338
ventricosa, Phasianella, 52
ventricosa, Tivela, 355
ventricosus, Colus, 163
ventricosus, Conus, 265
ventriculus, Cypraea, 98
venulatus, Conus, 265
Venus, 352–353
venusta, Cypraea, 94
venusta, Haliotis, 23
venustula, Bursa, 129
venustulus, Siratus, 133
venustus, Nassarius, 179
venustus, Turbo, 48
- verae, Natica, 107
veraguensis, Phos, 168
vercoi, Cypraea, 94
verconis, Turbo, 45
verheoii, Cypraea, see fuscobruna, 88
VERMETIDAE, 61
Vermicularia, 61
vermedei, Dentalium, 282
vernica, Paphia, 364
vernicosum, Calliotectum, 224
verrilli, Diplodonta, 322
verrilli, Strombus, 75
verrucosa, Venus, 352
verrucosum, Cymatium, 122
verrucosus, Calpurnus, 99
verrucosus, Conus, 270
verrucosus, Nassarius, 181
verrucosus, Trochus, 45
verruculatus, Pleuroploca, 182
versicolor, Ischnochiton, 284
versicolor, Mitra, 197
versicolor, Nerita, 52
versicolor, Pyrene, 161
versicolor, Spondylus, 316
vertagus, Rhinoclavis, 66
Verticordia, 375
VERTICORDIIDAE, 375
vesica, Olivancillaria, 194
vesicalis, Polinices, 102
vesicaria, Hydatina, 279
VESICOMYIDAE, 351
vesiculosus, Cryptopecten, 315
vespaceum, Cymatium, 121
vespertilio, Cymbiola, 218
vespertilio, Pteryonotus, 141
vespertilionis, Cassidula, 281
vespertina, Scurria, 32
vestiarum, Umbonium, 43
vestita, Glycymeris, 296
vestita, Neverita, 102
Vexilla, 150
VEXILLIDAE, 205–208
Vexillum, 205–208
vexillum, Atrina, 300
vexillum, Comptopallium, 307
vexillum, Conus, 250
vexillum, Harpulina, 220
vexillum, Mitra, 200
vexillum, Vexilla, 150
viabrunnea, Bathytoma, 241
vibex, Cypraea, 86
vibex, Nassarius, 179
vicdani, Angaria, 51
vicdani, Murex, 129
victor, Conus nobilis, 247
victor, Ctenocardia, 329
victoriae, Conus, 244
victoriae, Dosinia, 361
victoriae, Tellina, 343
vicweei, Conus, 255
vidua, Conus marmoreus, 244
vidua, Oliva, 192
villepinii, Conus, 269
vimineus, Conus, 252
vincta, Dentimitrella, 161
vinctus, Conus, 256
vinosa, Cypraea, 97
violacea, Batissa, 352
violacea, Coralliophila, 155
violacea, Lambis, 81
violacea, Mactra, 333
violacea, Natica, 109
violacea, Neritina, 54
violacea, Psammotaea, 347
violacescens, Glycymeris, 296
violaceus, Conus, 264
violascens, Asaphis, 347
violascens, Ruditapes, 365
virens, Sinuacula, 349
virescens, Fissurella, 28
virescens, Voluta, 212
virgata, Cominella, 170
virgata, Mitra, 201
virgata, Tellina, 341
virgatus, Acteon, 278
virgatus, Conus, 272
virgatus, Phos, 168
virgatus, Trochus, 45
- virginea, Aperiovula, 99
virginea, Haliotis, 20
virginea, Neritina, 54
virgineus, Chicoreus, 135
virginica, Crassostrea, 318
virgo, Conus, 253
virgo, Polystira, 239
viridis, Chiton, 288
viridis, Conus, 258
viridis, Perna, 297
viridis, Smaragdia, 55
viridis, Smaragdinella, 280
viridis, Solen, 338
viridizona, Pteria, 301
viridula, Conus, 244
viridula, Diodora, 26
viridula, Scurria, 32
visagenus, Conus, 266
vitellinum, Laevicardium, 331
vitellus, Cypraea, 97
vitellus, Natica, 106
vitrea, Carinaria, 101
VITRINELLIDAE, 58
vittata, Bullia, 177
vittata, Marginella, 237
vittata, Vexillum, 205
vittatus, Conus, 271
vittatus, Donax, 345
vittatus, Strombus vittatus, 79
vittatus, Zeacolpus, 59
Vitulina, 144
vitulina, Mitra, 199
vitulinus, Conus, 254
vogdesi, Pecten, 305
vokesae, Pteropurpura, 140
Volachlamys, 308
volcano, Fissurella, 28
Volema, 176
voluminalis, Conus, 250
Voluta, 212
Volutharpa, 175
VOLUTIDAE, 212–225
Volutifusus, 223
Volutocorus, 219
Volutocorbis, 212–213
Volutomitra, 225
VOLUMITRIDAE, 225
Volutopsius, 162
Volva, 100
volva, Volva, 100
volvox, Lorica, 287
vomer, Strombus vomer, 80
vulgare, Dentalium, 283
vulgaris, Lima, 319
vulgaris, Malleus, 302
vulgaris, Pecten, 304
vulgata, Patella, 29
vulgatum, Cerithium, 64
vulneratus, Pitar, 357
vulpecula, Vexillum, 205
Vulsella, 302
vulsella, Tellina, 340
vulsella, Vulsella, 302
- wagneri, Cantharus, 171
wagneri, Tugurium, 74
waikikiensis, Cypraea, 92
wainwrightensis, Chlamys, 311
waitei, Beryllsma, 168
wakayamaensis, Conus, 251
walallensis, Haliotis, 20
walkeri, Cypraea, 89
walkeri, Latirus, 185
wallangra, Conus, 262
walleri, Siphonofusus, 166
wardiana, Pugilina, 176
wardiana, Semipallium, 308
waterhousei, Conus, 263
watsoni, Morum, 116
watsoni, Propeamusium, 303
weaveri, Cypraea, 89
westralis, Cancellaria, 226
whitworthi, Phallium, 114
wilkinsi, Cypraea, 90
williamsi, Oliva, 192
williamsorum, Teramachia johnsoni, 224
wilsoni, Austroharpa, 212
winckworthi, Latiaxis, 155
- winteriana, Siliqua, 340
wisemani, Cymbiolacca, 217
withrowi, Scalptia, 230
wittigi, Conus, 257
woldemarii, Zierliana, 208
wolffi, Nassarius, 178
woodringi, Murex, 132
woolacottae, Cymbiolacca, 217
woolseyi, Conus, 268
wrighti, Mitra, 198
wrightianus, Spondylus, 316
wyvillei, Phallium coronadoi, 112
- XANCIDAE, 208–211
xanthicus, Conus, 272
Xanthochorus, 153
xanthochrysa, Cypraea, 98
xanthodon, Cypraea, 88
xanthostoma, Xanthochorus, 153
Xenophora, 73–75
XENOPHORIDAE, 73–75
Xenoturris, 239
ximenes, Conus, 272
- yaekoe, Mitra, 198
yaloka, Cypraea, 91
yatei, Bassina, 367
yatesi, Typhina, 158
yessoensis, Patinopecten, 306
yoka, Guildfordia, 49
yokoyamai, Euspira, 103
Yoldia, 290
- zaca, Mitra, 199
zamboi, Homalocantha, 139
zanzibarica, Tudicula, 210
Zeacolpus, 59
Zeatrophon, 153
zebra, Arca, 291
zebra, Cypraea, 96
zebra, Littorina, 57
zebra, Mitra, 201
zebra, Natica, 108
zebra, Phasianella, 52
zebra, Terebra, 277
zebrina, Scurria, 32
zebrina, Vexillum, 208
zebroides, Conus, 265
zebuensis, Brechites, 375
zebuensis, Caecella, 338
zelandiae, Chlamys, 313
zelandica, Atrina pectinata, 300
zelandica, Dosina, 362
zelandica, Felaniella, 323
zelandica, Monia, 317
zelandica, Natica, 108
zelandica, Panopea, 371
zelandicum, Dentalium, 283
zelandicum, Umbonium, 43
zelandicus, Poirieria, 143
zelebori, Cirsotrema, 70
zelindae, Oliva, 193
zelotes, Buccinum, 175
Zemira, 174
Zenatia, 337
zeteki, Comptopallium, 307
zeylanica, Babylonina, 173
zeylanicus, Conus, 260
ziczac, Cypraea, 91
ziczac, Littorina, 57
ziczac, Neritina, 54
ziczac, Pecten, 305
Zidona, 218
Zierliana, 208
zizyphinus, Calliostoma, 36
zonalis, Batillaria, 63
zonalis, Engina, 169
zonalis, Limopsis, 295
zonamestum, Calliostoma, 39
zonaria, Cypraea, 87
zonaria, Natica, 109
zonata, Engina, 169
zonata, Hydatina, 279
zonata, Mitra fusiformis, 199
zonatus, Clypeomorus, 65
zonatus, Conus, 244

THIRD PRINTING REVISIONS

Recent research publications and suggestions by watchful conchologists have pointed out some necessary improvements to our taxonomy. Changes to the captions that were made in the second printing in 1983 have an asterisk (*). In this erratum, following the page number (i.e., p. 27) is the number of the illustration. Thus, p. 27-1 refers to the first plate-illustration on page 27; and p. 27-12 refers to the 12th or last plate on page 27.

GASTROPODA

- p. 27-5 **Oblong Slot Limpet** should be **Western Slot Limpet**. (1") 2.5 cm *Dolichoschisma munita* Iredale, 1940. W. Australia. Subtidal; common.
- p. 34-1 change size to (0.8") 2 cm.
- p. 34-2 *Basilissa babelica* is in the family Orectospiridae; see other on p. 68.
- p. 39-1 the author of *javanicum* is (Lamarck, 1822), not Gmelin.
- p. 63-9 & -10 interchange the entire labels for the **Zoned Cerith** and the **Many-formed Cerith**.
- p. 68-4 Read *Orectospira tectiformis* (Watson, 1884).
- p. 69-9 for *E. annulatum* K. & I. read *Amaea iwaotakii* Azuma, 1961 (an earlier name).
- p. 74-11 correct *X. corrugata* (Reeve, 1843) to *Xenophora cerea* (Reeve, 1843).
- p. 88-5 for *Verheof's* and *verheofi*, read *Verhoeff's* and *verhoeffi*. Also index, p. 410.
- p. 119 The family name Cymatiidae has been replaced by the earlier name, Ranellidae.
- p. 124-9 for *jacundum*, read *jucundum*.
- p. 127-8 for Mulhaus, read Mulhauser.
- p. 131-8 for *bellegladensis*, read *bellegladeensis*.
- p. 132-4 for *tricornis*, read *tricornis*.
- p. 136-11 Correct **Banks' Murex** to **Quadrate Murex**. *Chicoreus quadrifrons* (Lamarck, 1822).
- p. 145-11 for *Cuma*, read *Cymia*.
- p. 152-2 **Dall's Trophon** should be *muriciformis* (Dall, 1877), an earlier name for *dalli* (Kobelt, 1878).
- p. 152-8 holotype illustrated is of *smithi* Dall, 1902, a synonym of *stuarti*.
- p. 156-12 for *antiquatus*, read *antiquus*.
- p. 161-9 this is an unknown *Amalda*, see p. 195.
- p. 162-10 for *spitzbergeni*, read *spitzbergensis*.
- p. 174-1 **Pallid Babylon**, should be **Walkway Babylon**. (1.5") 4cm *Babylonia ambulacrum* Sowerby, 1825. S.E. Asia. Offshore; common.

- p. 242-5 **Little-dog Turrid** should be **Flame Turrid**. (1") 2.5 cm *Imaclava flammulata* (Montfort, 1810). S.W. Pacific. Offshore; uncommon.
- p. 260-6 correct **Lightning cone** to **Thousand-spot Cone**, *Conus miliaris* Hwass, 1792, see same species row above.
- p. 278-2 genus *Niso* is in prosobranch family Melanellidae.

BIVALVIA

- p. 291-3 **Chilean Malletia** is the **Austral Neilo** (1.5") 3.5 cm *Neilo australis* (Quoy & Gaimard, 1835). New Zealand. In mud, 30 to 2,000 m; uncommon. Syn.: *cumingii* A. Adams.
- p. 292-11 The author of *scapha* is (Gmelin, 1791), not Linnaeus.
- p. 293-2 **Half-crenate Ark** should be **Grand Ark** (4") 10 cm *Anadara grandis* (Broderip & Sowerby, 1829). W. Mexico to Peru. Common. See p. 292-9.
- p. 303-1 change genus to *Malleus* (subgenus *Malvufundus*).
- p. 307-10 for *nodiferus*, read *noduliferus*.
- p. 308-6 **Gardiner's Scallop** should be **Blistered Scallop** (1.5") 3.5 cm *Cryptopecten vesiculosus* (Dunker, 1877). Japan. 50-600 m.; common.
- p. 309-4 & -5 replace name *Cryptopecten* with *Gloriopallium*.
- p. 312-3 **Lambert's Scallop** should be **Golden Scallop** (2.5") 6 cm *Bractechlamys aurantiaca* (Adams & Reeve, 1850). W. Pacific. Offshore; uncommon.
- p. 313-5 **Golden Scallop** should be **Diana's Scallop** (2") 5 cm *Bractechlamys diana* (Crandall, 1979). Has 10 ribs.
- p. 315-1 **Blistered Scallop** should be **Catspaw Scallop** (1.5") 3.5 cm *Chlamys (Manupecten) pesfelis* (L., 1758).
- p. 315-7 *Chlamys multistriata* is now *Hinnites distortus* (Da Costa, 1778), the former being a junior synonym.
- p. 315-8 The **Giant Rock Scallop** is now *Crassadoma gigantea* (Gray, 1825).
- p. 318-9 **Native Pacific Oyster** is now *Ostreola conchaphila* (Carpenter, 1857) with *lurida* a synonym.
- p. 334-2 delete *ornata* Gray from the synonymy; see that species below.
- p. 345-8 **California Donax** should be **Gould's Donax** (0.7") 1.4 cm *Donax gouldii* Dall, 1921. Calif. to Baja Calif.; sandy beaches; common.



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R. TUCKER ABBOTT is one of the leading conchologists of the world, having served as a research scientist and field collector for forty years at Harvard University, the Smithsonian Institution and the Academy of Natural Sciences of Philadelphia. Dr. Abbott has led numerous expeditions for mollusks to China, the Philippines, Africa, Cuba and other out-of-the-way collecting grounds. He is Editor in Chief of *The Nautilus*, one of the oldest and most influential scientific periodicals concerned with malacology, and also the author of numerous popular books including *American Seashells* and *Kingdom of the Seashell*.

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